
Updating Facilities Study

Generation Interconnection

City and County of San Francisco

**San Francisco Electric Reliability Power
Project**



***Pacific Gas and
Electric Company***

WE DELIVER ENERGY.

March 19, 2004

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1. Executive Summary

The City and County of San Francisco (CCSF) proposes to interconnect a new gas turbine generating facility to Pacific Gas & Electric's (PG&E's) Potrero 115 kV Switchyard. The project is called the San Francisco Electric Reliability Power Project (SFERPP). The proposed project will consist of three LM6000 units rated 50.5 MW each. The net output of the proposed project will be 145.1 MW. The on-line date of the proposed project is December 2006. The proposed project will be connected to Pacific Gas & Electric Company's (PG&E's) transmission grid via two new 115 kV generation tie lines. A System Impact Study (SIS) was not conducted for this specific configuration. However, PG&E and the California Independent System Operator (Cal-ISO) have agreed that the results of any SIS would be so similar to the SIS conducted for Alternative 1 that a new SIS would not be required.

The SIS for Alternative 1 showed that a Facilities Study (FS) would be required for a project of any size interconnecting to the Potrero Switchyard 115 kV bus. An FS was conducted assuming that the SFERPP would consist of four LM6000s. That FS was issued on February 19, 2004. This Updating Facilities Study (UFS) will provide a FS with the new configuration of three LM6000 turbines. At the request of CCSF, the SFERPP Interconnection Queue position with respect to Mirant's Potrero 7 project was ignored in the SIS. This UFS includes a Supplemental SIS to provide the system impacts caused by the SFERPP if Mirant's Potrero 7 Project were to be built.

This UFS provides:

1. Cost estimates and work scope for the facilities necessary to interconnect the SFERPP to PG&E's grid without Potrero 7 Project.
2. Preliminary system impact assessment and mitigation plan for the SFERPP if Potrero 7 Project were built in the future.
3. Rough cost estimate and work scope necessary to mitigate the adverse impact of the SFERPP if Mirant's Potrero 7 project were built.

If Potrero 7 Project were to be built in the future and SFERPP is on-line, the preliminary system impact assessment concluded that the following two new 115 kV underground cables would be needed to relieve the local congestion:

- Potrero-Martin #3 (AH-3) cable with a normal rating of 250 MVA.
- Potrero-Martin #4 (AH-4) cable with a normal rating of 250 MVA.

In addition to the these two new 115 kV cables, the following PG&E capacity project and new emergency cable rating would be needed to fully mitigate the congestion caused by CCSF if Potrero 7 Project were to come on-line:

- PG&E capacity project T655 to add a second 230/60 KV Transformer Bank at Jefferson.

- Emergency rating for the Potrero – Mission 115 kV underground cable.

With this mitigation plan, one of the two cables between Hunters Point and Potrero originally required for the Potrero 7 Project would no longer be needed.

The cost of direct assignment facilities to interconnect the project would be approximately **\$2.7 million** exclusive of ITCC¹.

The cost for network upgrades to interconnect the project would be approximately **\$0.8 million** exclusive of ITCC without Mirant's Potrero 7 Project.

If Mirant's Potrero 7 Project comes on-line in the future, the additional network upgrades costs for CCSF would be approximately **\$78 million** exclusive of ITCC.

¹ Income Tax Component of Contribution

2. Project Information and Interconnection Plan

Table 2-1 provides general information about the San Francisco Electric Reliability Power Project.

San Francisco Electric Reliability Power Project Location	Site 1 (Potrero) see Figure 2-1.
PG&E Planning Area	Area 7 (San Francisco)
Number and Type of Generators	3 - LM6000 Gas Turbines
Maximum Generator Output	151.5 MW
Generator Auxiliary Load	5.4 MW
Maximum Net Output to Grid	145.1 MW
Power Factor	85% (Lag) – 95% (Lead)
Description Of Interconnection Configuration	All units connect to PG&E's Potrero 115 kV Switchyard
Connection Voltage	115 kV

Table 2-1: The San Francisco Electric Reliability Power Project General Information

The proposed project consists of three (3) LM6000 gas turbines. Each LM6000 gas turbine is rated at 50.5 MW, 85% (lag) – 95% (lead) power factor. Each generator will have a 13.8/115 kV step-up transformer. All three LM6000 units connect to PG&E's Potrero 115 kV Substation from Site 1 (Potrero) as shown in Figure 2-1.

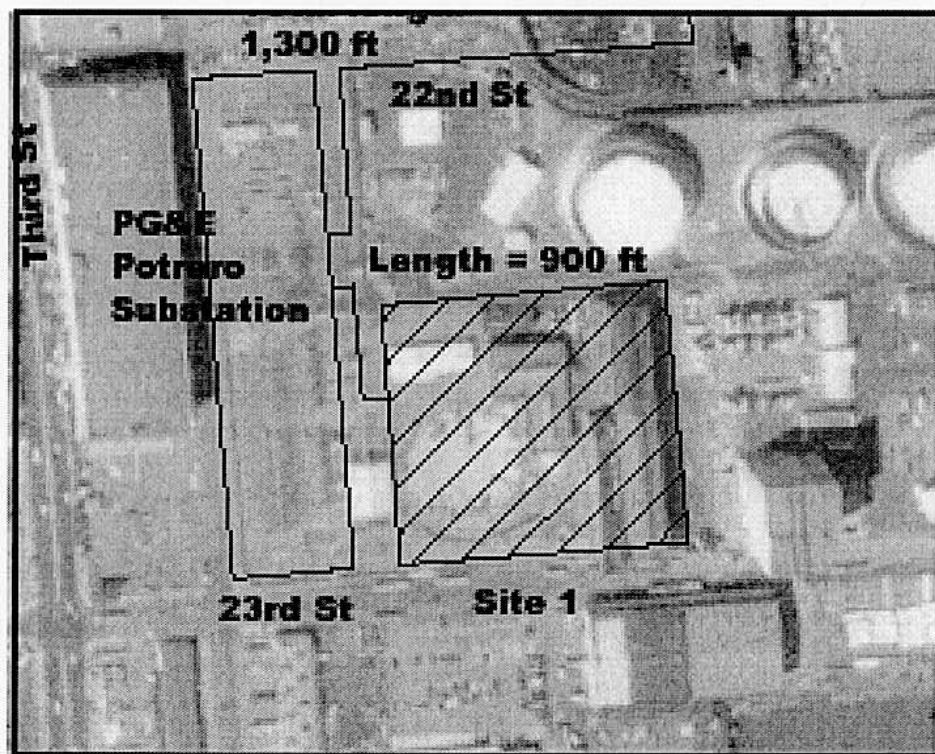


Figure 2-1: Map of the San Francisco Electric Reliability Power Project

A conceptual one-line diagram of the project is provided in Figure 2-2.

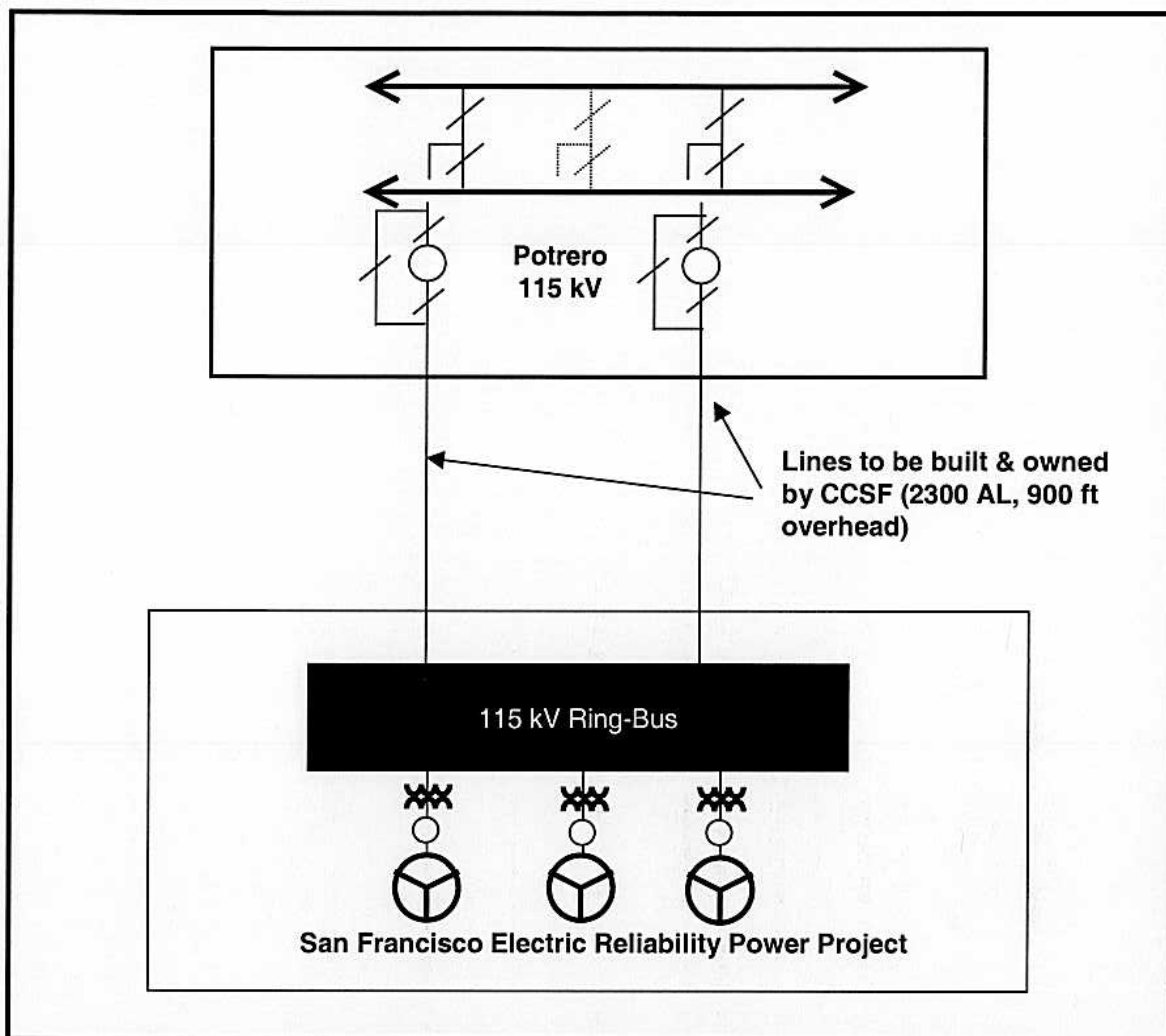


Figure 2-2: Conceptual One-Line Diagram of the San Francisco Electric Reliability Power Project

3. Cost Summary & Schedule

A cost summary is provided below with more detailed direct assignment costs provided in Subsection 3.1. Subsection 3.2 provides more detailed costs for network upgrades required to interconnect the project. Costs provided are not final and will need to be reconciled with actual costs upon completion of the project. Appendix D, Section 6 and Section 7 provide the scope of the required work.

Total Direct		
Assignment Cost	\$2,725,000	
ITCC Tax @ 22 %	\$599,500	
Total Direct Assignment Cost with ITCC		\$3,324,500
Network Upgrade		
Costs	\$800,000	
ITCC Tax @ 22 %	\$176,000	
Total Network Upgrade Cost with ITCC		\$976,000
Additional Network		
Upgrade Costs When		
Mirant's Potrero 7		
Project is On-Line	\$78,000,000	
ITCC Tax @ 22 %	\$17,176,000	
Total Additional Network Upgrade Cost with ITCC		\$95,176,000
Total Costs		\$100,436,500

3.1 Direct Assignment Facilities

Table 3-1 provides a summary of the cost estimates² for the facilities required to interconnect the SFERPP with PG&E's transmission system. These are the facilities necessary to physically and electrically interconnect a New Facility Operator to the ISO Controlled Grid at the point of interconnection. These costs are not final and will need to be reconciled with actual costs upon completion of the project.

The SFERPP requires the same work scope for direct assignment facilities and its associated costs without respect to Potrero 7 Project's status.

² PG&E interconnection engineering cost estimates are developed with a theoretical confidence level of 25 percent. Billing will be based on an actual cost basis.

Substation Work at SFERPP Switchyard:	
Testing (SCADA/EMS and pre-parallel inspection)	\$250,000
Substation Work at Potrero Switchyard:	
Add two (2) new 115 kV breakers with by-pass switches, associated protection, and telecommunications equipment for interconnection of generation tie lines	\$2,400,000
Substation Work at SFERPP Switchyard: Install	
fiber termination equipment and testing	\$70,000
PG&E Corporate Real Estate - 851 filing with CPUC	\$5,000
Subtotal	\$2,725,000
ITCC Tax (22%)	\$599,500
Total	\$3,324,500

Table 3-1: Direct Assignment Costs

3.2 Network Upgrades Costs

Network upgrades are those facilities beyond SFERPP's point of interconnection with PG&E's transmission grid that are required to interconnect the project or mitigate system impacts caused solely by the project. SFERPP is behind Mirant's Potrero 7 Project in the interconnection queue. However, the SIS assumed that SFERPP would be on line before the Potrero 7 Project. Therefore, the network upgrades costs have two components: (1) Network upgrades costs when the project first comes on line without the Potrero 7 Project; and (2) Additional network upgrades costs when the Potrero 7 Project comes on line in the future. Table 3-2 provides a summary of the cost estimates for upgrades to the system that would be required to interconnect the project. Table 3-3 shows the costs of the additional Network Upgrades that would be required if Potrero 7 were on-line. The costs shown in Table 3-3 were developed using unit costs.³

³ A unit cost is the average installed cost for an asset such as a circuit breaker or pole or the per mile cost of installing a transmission line. Unit costs do not account for special circumstances and have no intended degree of accuracy. The use of unit costs usually results in estimates below the actual costs of a project.

Substation Work at Potrero Switchyard:	
Install bus selector switches and insulators for the two generation tie line breakers	\$350,000
Various PG&E Locations:	
Install telecommunications equipment to upgrade SF RAS	\$400,000
PG&E TOC and Switching Center:	
SCADA/EMS, programming, testing, and screening	\$50,000
Subtotal	\$800,000
ITCC Tax (22%)	\$176,000
Total	\$976,000

Table 3-2: Network Upgrade Costs

3.3 Additional Network Upgrades Costs With Potrero 7 Project On-line

Substation Work at Potrero Switchyard:	
Add two (2) new 115 kV breakers with switches, associated protection, and telecommunications equipment for interconnection of new transmission lines to Martin Substation.	\$4,000,000
Substation Work at Martin Substation:	
Add two (2) new 115 kV breakers with switches, associated protection, and telecommunications equipment for interconnection of new transmission lines from Potrero Switchyard	\$2,000,000
Transmission Line Work:	
Build two (2) 6 mile long 115 kV cables between Potrero Switchyard and Martin Substation, cables in same trench	\$72,000,000
Subtotal	\$78,000,000
ITCC Tax (22%)	\$17,176,000
Total	\$95,176,000

Table 3-3: Additional Network Upgrade Costs With Potrero 7

3.4 Tentative Construction Schedule

The tentative schedule to engineer and construct the facilities based on the work scope outlined in this UFS (excluding the work described in Subsection 3.2.1) is approximately 18 months from the signing of the Generator Special Facilities Agreement. This is based upon the assumption that the environmental permitting obtained by CCSF is adequate for permitting all PG&E activities.

Note that if CPUC requires PG&E to obtain a Permit to Construct (PTC) for the generation tie line or any other work associated with the project,

an additional \$1 million to \$2 million would be added to the project costs and the project could require an additional one to two years to complete.

The schedule to perform the work described in Section 3.3 is five to ten years.

4. Study Assumptions

PG&E conducted the UFS under the following assumptions:

- 1) The maximum total output from the San Francisco Electric Reliability Power Project is 151.5 MW from three (3) LM600 gas turbines. The expected plant total plant load is 5.4 MW. The maximum net output to the grid is 145.1 MW.
- 2) The expected on-line date is December 2006.
- 3) Each generator will have a step-up transformer. Each transformer for the LM6000 gas turbine is a three phase transformer, 13.8/115 kV impedance grounded wye, rated 40/45/60 MVA @ 55 degree C temperature rise. The impedance is 12% @ 40 MVA base.
- 4) CCSF will engineer, procure, construct, own, and maintain its project facility and the 115 kV generator tie lines.
- 5) This study took into account the planned generating facilities in PG&E's service territory whose schedules are concurrent with or precede the San Francisco Electric Reliability Power Project's schedule.
- 6) The study took into account all approved PG&E transmission capacity projects that will be operational by June 2005. The sensitivity study took into account all approved PG&E transmission capacity projects that will be operational by June 2007.

CCSF requested that PG&E conduct the SIS and this UFS using the following specific assumptions:

	Before San Francisco Electric Reliability Power Project	After San Francisco Electric Reliability Power Project
Mirant's Potrero 7 Power Project	Not Built	Not Built
Hunters Point Unit 4	ON	OFF
One (1) 115 kV Cable between Potrero and Hunters Point	Is Built	Is Built
San Mateo-Martin #4 60 kV to 115 kV Line Conversion	Is Completed	Is Completed
Jefferson-Martin 230 kV Cable	Not Built	Not Built

For the Supplemental SIS the following assumptions were made.

	Before San Francisco	After San Francisco
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	Electric Reliability Power Project	Electric Reliability Power Project
Mirant's Potrero 7 Power Project	Built	Built
Hunters Point Unit 4	OFF⁴	OFF
Three (3) 115 kV Cables between Potrero and Hunters Point	Are Built	Are Built
San Mateo-Martin #4 60 kV to 115 kV Line Conversion	Is Completed	Is Completed
Jefferson-Martin 230 kV Cable	Built	Built

5. Supplemental SIS / Mitigation

A Supplemental SIS was conducted to determine the impact of the project assuming that Potrero 7 is built. Prior studies have shown that the Summer Peak base case represents the most constrained system conditions for evaluating new generation projects in San Francisco.

5.1 Power Flow Analysis

The 2007 Summer Peak power flow base case was used to evaluate the transmission system impacts of the San Francisco Electric Reliability Power Project assuming that Potrero 7 Power Project is built. While it is impossible to study all combinations of system load and generation levels during all seasons and at all times of the day, this base case represents extreme loading and generation conditions for the study area.

■ 2007 Summer Peak Base Case:

Power flow analysis was performed using PG&E's 2007 Summer Peak Base Case (in General Electric Power Flow format). Modeling of the Bay Area load will be done according to the latest PG&E load forecast methodology, in which the load forecast is based on the weather-adjusted load with a 1-in-10 year heat wave load in the San Francisco/Peninsula area.

The 2007 Summer Peak Base Case was used to simulate the impact of the new facility during normal operating conditions and single (ISO Categories "B") outages.

The single (ISO Category "B") contingencies included the following outages:

5.1.1 CAISO Category "B"

- All single generator outages in the San Francisco/Peninsula areas.
- All single (60 - 230 kV) transmission circuit outages in the San Francisco/Peninsula areas.

⁴ This is corrected from the assumptions shown in the Facilities Study Plan. The studies for Potrero 7 assume that Hunters Point Power Plant will be completely shut down after Potrero 7 comes on line.

- All single transformer outages in the San Francisco/Peninsula areas.
- Overlapping single generator and transmission circuit outages for the transmission lines and generators in the San Francisco/Peninsula areas.

5.2 Power Flow Results

Appendix A provides a list of the contingencies studied. Appendix B shows the steady state power flow analysis results. Appendix C includes selected power flow plots.

5.2.1 Normal Overloads (CAISO Category A)

The addition of the San Francisco Electric Reliability Power Project causes six (6) normal overloads during the 2007 Summer Peak conditions. Table 5-1 provides the details of these overloads.

Over Loaded Component	Rating (Amps)	Pre- Project Loading (Amps [%Rating])		Post-Project Loading (Amps [%Rating])		% Change from Pre- Project Loading
Hunters Point – Martin #1 115 kV Line	650	506	78%	681	105%	27%
Hunters Point – Martin #3 115 kV Line	650	483	74%	649	100%	26%
Potrero – Martin #1 115 kV Line (Bayshore 1 – Martin)	725	587	91%	770	106%	15%
Potrero – Martin #1 115 kV Line (Potrero – Bayshore1)	725	612	85%	795	110%	25%
Potrero – Martin #2 115 kV Line (Bayshore 2 – Martin)	650	555	85%	728	112%	27%
Potrero – Martin #2 115 kV Line (Potrero – Bayshore 2)	650	590	91%	763	117%	26%

Table 5-1: Category A Normal Overloads – Summer Peak 2007

5.2.2 Emergency Overloads (CAISO Category B)

The addition of the San Francisco Electric Reliability Power Project causes or exacerbates Category B emergency overloads on eleven (11) transmission facilities during the 2007 Summer Peak conditions. Table 5-2 provides the details of these overloads.

Over Loaded Component	Contingency	Rating (Amps)	Pre- Project Loading (Amps [%Rating])		Post-Project Loading (Amps [%Rating])		% Change from Pre- Project Loading
Hunters Point – Martin #1 115 kV Line	Hunters Point - Martin #3 115 kV Line	650	718	110%	966	149%	+39%
	Potrero - Martin #1 115 kV Line	650	710	109%	946	146%	+37%
	Potrero - Martin #2 115 kV Line	650	699	107%	930	143%	+36%
	Larkin 115/12 kV Banks 1, 3 and 5	650	608	93%	783	120%	+27%

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Over Loaded Component	Contingency	Rating (Amps)	Pre- Project Loading (Amps %Rating)		Post-Project Loading (Amps %Rating)		% Change from Pre- Project Loading
	Larkin 115/12 kV Banks 2, 4 and 6	650	598	92%	773	119%	+27%
Hunters Point - Martin #3 115 kV Line	Hunters Point - Martin #1 115 kV Line	650	700	108%	941	145%	+37%
	Potrero - Martin #1 115 kV Line	650	677	104%	901	139%	+35%
	Potrero - Martin #2 115 kV Line	650	666	102%	886	136%	+34%
	Larkin 115/12 kV Banks 1, 3 and 5	650	580	89%	746	115%	+26%
	Larkin 115/12 kV Banks 2, 4 and 6	650	570	88%	737	113%	+25%
Potrero – Martin #1 115 kV Line (Bayshore 1 – Martin)	Potrero – Martin #2 115 kV Line	725	788	109%	1029	142%	+33%
	Hunters Point – Martin #1 115 kV Line	725	730	101%	963	133%	+32%
	Hunters Point – Martin #3 115 kV Line	725	721	99%	950	131%	+32%
	Larkin 115/12 kV Banks 1, 3 and 5	725	683	94%	866	119%	+25%
	Larkin 115/12 kV Banks 2, 4 and 6	725	674	93%	857	118%	+25%
	Potrero – Hunters Point #1 115 kV Line	725	627	87%	817	113%	+26%
	Potrero – Hunters Point #2 115 kV Line	725	625	86%	812	112%	+26%
	Potrero – Hunters Point #3 115 kV Line	725	625	86%	812	112%	+26%
Potrero – Martin #1 115 kV Line (Potrero – Bayshore 1)	Potrero – Martin #2 115 kV Line	725	813	112%	1055	145%	+33%
	Hunters Point – Martin #1 115 kV Line	725	755	104%	987	136%	+32%
	Hunters Point – Martin #3 115 kV Line	725	746	103%	974	134%	+31%
	Larkin 115/12 kV Banks 1, 3 and 5	725	708	98%	891	123%	+25%
	Larkin 115/12 kV Banks 2, 4 and 6	725	699	96%	882	122%	+26%
	Potrero – Hunters Point #1 115 kV Line	725	652	90%	842	116%	+26%
	Potrero – Hunters Point #2 115 kV Line	725	651	90%	837	115%	+25%
	Potrero – Hunters Point #3 115 kV Line	725	651	90%	837	115%	+25%
Potrero – Martin #2 115 kV Line (Bayshore 2 – Martin)	Potrero - Martin #1 115 kV Line	650	757	116%	991	152%	+36%
	Hunters Point – Martin #1 115 kV Line	650	691	106%	911	140%	+34%
	Hunters Point – Martin #3 115 kV Line	650	682	105%	899	138%	+33%
	Larkin 115/12 kV Banks 1, 3 and 5	650	647	99%	820	126%	+27%
	Larkin 115/12 kV Banks 2, 4 and 6	650	638	98%	811	125%	+27%
	Potrero – Hunters Point #1 115 kV Line	650	593	91%	773	119%	+28%

Over Loaded Component	Contingency	Rating (Amps)	Pre- Project Loading (Amps %Rating)		Post-Project Loading (Amps %Rating)		% Change from Pre- Project Loading
	Potrero – Hunters Point #2 115 kV Line	650	589	91%	769	118%	+27%
	Potrero – Hunters Point #3 115 kV Line	650	589	91%	769	118%	+27%
Potrero – Martin #2 115 kV Line (Potrero – Bayshore 2)	Potrero - Martin #1 115 kV Line	650	792	122%	1025	158%	+36%
	Hunters Point – Martin #1 115 kV Line	650	726	112%	946	145%	+33%
	Hunters Point – Martin #3 115 kV Line	650	717	110%	934	144%	+34%
	Larkin 115/12 kV Banks 1, 3 and 5	650	681	105%	855	131%	+26%
	Larkin 115/12 kV Banks 2, 4 and 6	650	672	103%	846	130%	+27%
	Potrero – Hunters Point #1 115 kV Line	650	628	97%	808	124%	+27%
	Potrero – Hunters Point #2 115 kV Line	650	623	96%	803	124%	+28%
	Potrero – Hunters Point #3 115 kV Line	650	623	96%	803	124%	+28%
Potrero – Mission 115 kV Line	Potrero - Larkin #2 115 kV Line	700	698	100%	741	106%	+6%
San Mateo – Hillsdale Jct 60 kV Line (Beresford – Hillsdale)	Jefferson 230/60 kV Bank 1	558	678	121%	681	122%	+1%
San Mateo – Hillsdale Jct 60 kV Line (Hillsdale – Hillsdale Jct)	Jefferson 230/60 kV Bank 1	553	603	109%	606	110%	+1%
San Mateo – Hillsdale Jct 60 kV Line (San Mateo – Beresford)	Jefferson 230/60 kV Bank 1	553	759	137%	762	138%	+1%
	Cooley Landing - Stanford 60 kV Line	553	534	97%	556	100%	+3%
San Mateo 115/60 kV Bank 3	Jefferson 230/60 kV Bank 1	67.5 MVA	71 MVA	105%	72 MVA	106%	+1%

Table 5-2: Category B Emergency Overloads – Summer Peak 2007

5.3 Short Circuit Analysis

PG&E has determined that, due to the preliminary nature of the mitigation plan, it would not be meaningful to perform a short circuit analysis at this time. However, PG&E reserves the right to perform a short circuit analysis at a later date. Previous studies have shown that an aggregate generation capacity represented by the Potrero 7 Project and SFERPP would cause numerous overstressed breakers in the study area.

5.4 Mitigation

A mitigation plan was developed to provide relief from the overloads shown in powerflow results shown in Subsection 5.2. The preliminary evaluation concluded that the following two new 115 kV underground cables and PG&E's Jefferson Transformer Project are needed to relieve the local congestion:

- Potrero-Martin #3 (AH-3) cable to have a normal rating of 250 MVA.

- Potrero-Martin #4 (AH-4) cable with a normal rating of 250 MVA.
- PG&E capacity project T655 to add a second 230/60 KV Transformer Bank at Jefferson. This project has an EDRO date of 2005.⁵

With these two new 115 kV underground cables from Potrero to Martin, one of the two 115 kV cables proposed between Hunters Point and Potrero originally required for the Potrero 7 Project would no longer be needed.

After modeling these required facilities in the powerflow case, there would be one remaining normal overload as shown in Table 5-3 and one Category B emergency overload as shown in Table 5-4.

The Eastshore Transformer Bank normal overload is a result of the modeling of the Russell City Energy Center. If the Russell City Energy Center were to be built, it would add a new 230/115 kV transformer bank at East shore Substation and this overload would be eliminated. For the marginal emergency overloads in Table 5-4, PG&E would seek emergency ratings for this cable.

Over Loaded Component	Rating (Amps)	Pre- Project Loading (Amps %Rating)		Post-Project Loading (Amps %Rating)		% Change from Pre-Project Loading
East Shore 230/115 kV Bank 1	134 MVA	130 MVA	97%	134 MVA	100%	+3%

Table 5-3: Category A Normal Overloads – Summer Peak 2007 After Mitigation

Over Loaded Component	Contingency	Rating (Amps)	Pre- Project Loading (Amps %Rating)		Post-Project Loading (Amps %Rating)		% Change from Pre-Project Loading
Potrero – Mission 115 kV Line	Potrero - Larkin #2 115 kV Line	700	698	100%	723	103%	+3%

Table 5-4: Category B Emergency Overloads – Summer Peak 2007 After Mitigation

5.4.1 Comprehensive Mitigation Plan

In summary, the following additional new facilities and PG&E Reliability Projects would be needed to mitigate the impacts caused by SFERPP when Mirant's Potrero 7 plant is on line:

- Build a new Potrero-Martin #3 (AH-3) cable with a normal rating of 250 MVA.
- Build a new Potrero-Martin #4 (AH-4) cable with a normal rating of 250 MVA.

⁵ This ISO-approved project has not received final approval from PG&E management.

- Add PG&E capacity project T655 to add a second 230/60 KV Transformer Bank at Jefferson.
- Obtain an emergency rating for the Potrero – Mission 115 kV underground cable.

Costs for the new cables are included in Section 3 as Additional Network Upgrades required when Mirant's Potrero 7 Project comes on-line.

If this event occurs, additional engineering analysis would be required to confirm this preliminary mitigation plan and evaluate the secondary impact of this plan, such as short circuit and overstressed breaker analysis.

6. Substation Evaluation

6.1 Direct Assignment Work

The Substation Evaluation determined a work scope for the Direct Assignment facilities required for interconnecting the project. The major work is listed here and a more detailed work scope is provided in Appendix D.

- At Potrero Switchyard Bus Section E, use two spare bay positions Bay 17 and Bay 19 to create two 115 kV line breaker positions to receive the two in-coming gen-tie lines constructed by CCSF.
- Install two single-circuit TSP (Tubular Steel Pole)'s and one double-circuit TSP to route the two 115 kV circuits in the congested area to a proper location/spot to interface with the two in-coming 115 kV gen-tie lines constructed by CCSF.
- Install new underground conduits and fiber optic cable between Potrero Switchyard Control Building and SFERPP Control Building.
- Install two simplex type 19" wide switch racks for the two new line positions. Install new meters, protective relays, instrumentation and controls, and SCADA.

6.2 Network Upgrades

The Substation Evaluation determined a work scope for the Network Upgrades required for interconnecting the project. A more detailed work scope is provided in Appendix D and the major work is listed here.

Without the Potrero 7 Project:

- Install four (4) 115 kV bus selector air switches on existing structures.

- Modify the existing SFRAS to accommodate the new project.
- Install telecom equipment for EMS telemetry and SCADA.

Additional Work Required With the Potrero 7 Project:

- Martin Substation: Install two (2) 115 kV breakers.
- Potrero Switchyard: Install two (2) 115 kV breakers.

7. Transmission Line Evaluation

The transmission line evaluation determined the Network Upgrades required to interconnect the SFERPP to PG&E's transmission grid if Mirant's Potrero 7 Project were to come on line.

7.1 Network Upgrades Required with Potrero 7

- Build two (2) 115 kV underground cables, approximately 6 miles between Potrero Switchyard and Martin Substation in a single trench. Each cable is assumed to have a normal rating of 250 MVA.

8. Land Evaluation / Environmental Evaluation/ Permitting

PG&E's Corporate Real Estate Department has estimated Land Services costs for the proposed SFERPP. A cost estimate has been provided in Section 3 to reflect the time and consideration needed to perform preparation of the filing that may be required by Public Utilities Code Section 851.

Because PG&E is subject to the jurisdiction of the CPUC, it must also comply with Public Utilities Code Section 851. Among other things, this code provision requires PG&E to obtain CPUC approval of leases and licenses to use PG&E property, including rights-of-way granted to third parties for interconnection facilities. Obtaining CPUC approval for a Section 851 application can take several months, and requires compliance with the California Environmental Quality Act (CEQA). PG&E recommends that Section 851 issues be identified as early as possible so that the necessary application can be prepared and processed. The G.O. 131-D approval process is not within PG&E's scheduling control and is dependent upon intervenor interest. Approval schedules can be extended significantly.

8.1 CPUC General Order 131-D

Pacific Gas and Electric Company (PG&E) is subject to the jurisdiction of the California Public Utilities Commission (CPUC); and must comply with CPUC General Order 131-D (Order) on the construction, modification, alteration, or addition of all electric transmission facilities (i.e., lines, substations, switchyards, etc.). This includes facilities to be constructed by others and deeded to PG&E. In most cases where PG&E's electric

facilities are under 200 kV and are part of a larger project (i.e., electric generation plant), the Order exempts PG&E from obtaining an approval from the CPUC provided it's planned facilities have been included in the larger project's California Environmental Quality Act (CEQA) review, the review has included circulation with the State Clearinghouse, and the project's lead agency (i.e., California Energy Commission) finds no significant unavoidable environmental impacts. PG&E or the project developer may proceed with construction once PG&E has filed notice with the CPUC and the public on the project's exempt status, and the public has had a chance to protest PG&E's claim of exemption. If PG&E facilities are not included in the larger project's CEQA review, or if the project does not qualify for the exemption, PG&E may need to seek approval from the CPUC (i.e., Certificate of Public Convenience and Necessity or Permit to Construct) taking as much as 18 months or more since the CPUC would need to conduct it's own environmental evaluation (i.e., Negative Declaration or Environmental Impact Report).

PG&E recommends that the project proponent include PG&E facility work in its project description and application to the lead agency performing CEQA review on the project. The lead agency must consider the environmental impacts of the interconnection electric facility, whether built by the developer with the intent to transfer ownership to PG&E or to be built and owned by PG&E directly, and make a finding of no significant unavoidable environmental impacts from construction of those facilities. Once the project has completed the review process and the environmental document (i.e., Negative Declaration or Environmental Impact Report) finds no significant unavoidable environmental impacts from PG&E's work, PG&E would file an Advice Letter with the CPUC and publish public notice of the proposed construction of the facilities. The noticing process takes about 90 days if no protests are filed, but should be done as early as possible so that a protest does not delay construction. PG&E has no control over the time it takes the CPUC to respond when issues arise. If the protest is granted, PG&E may then need to apply for a formal permit to construct the project (i.e., Certificate of Public Convenience and Necessity or Permit to Construct). Facilities built under this procedure must also be designed to include consideration of electric and magnetic field (EMF) mitigation measures pursuant to PG&E "EMF Design Guidelines of New Electrical Facilities: Transmission, Substation and Distribution".

Please see Section III, in General Order 131-D. This document can be found in the CPUC's web page at:

http://www.cpuc.ca.gov/PUBLISHED/GENERAL_ORDER/589.htm

9. Study Updates

This Updating Facilities Study is performed according the assumptions shown in the Section titled "Study Assumptions". In the event that these assumptions are changed, an updating study may be required to re-evaluate SFERPP's impact on

PG&E's transmission grid. CCSF would be responsible for paying for any such updating study. Examples of changes that might prompt such a study are:

- Change in interconnection date.
- Change in Interconnection Queue position.
- Change in project's MW size.
- Change in interconnection plan.

10. Stand-by Power

This study does not address any requirements for stand-by power that the project may require. CCSF should contact their Generation Interconnection Services Representative regarding this service.

Note: CCSF is urged to contact their Generation Interconnection Services Representative promptly regarding stand-by service in order to ensure its availability for the project's start-up date.

Appendix A

Contingency Lists for Outages

Autocon Input Files

APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

```
# CCSFERPP - Category B Contingency List FS
#
#
# (1) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30685 30695 "1 " 0 # line from EMBRCDRD 230.00 BRKR to BRKR MARTIN C 230.00
4 30685 0 "1 " 0 # LOAD-DROP EMBRCDRD 230.00 LOAD==57.46(13.10)
4 30685 0 "2 " 0 # LOAD-DROP EMBRCDRD 230.00 LOAD==65.51(6.58)
1 30685 30690 "1 " 1 # LINE-TRANSFER MARTIN C to EMBRCDRD
4 30685 0 "3 " 1 # RESTORE EMBRCDRD load
0
#
#
# (2) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30690 30695 "1 " 0 # line from EMBRCDRD 230.00 BRKR to BRKR MARTIN C 230.00
4 30690 0 "3 " 0 # LOAD-DROP EMBRCDRD 230.00 LOAD==64.59(11.32)
4 30690 0 "5 " 0 # LOAD-DROP EMBRCDRD 230.00 LOAD==60.85(14.43)
1 30690 30685 "1 " 1 # LINE-TRANSFER MARTIN C to EMBRCDRD
4 30690 0 "3 " 1 # RESTORE EMBRCDRD load
0
#
#
# (3) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30700 30695 "1 " 0 # line from SANMATEO 230.00 BRKR to BRKR MARTIN C 230.00
0
#
#
# (4) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
# Potrero - Larkin #1 115 kV Line
1 33200 33204 "1 " 0 # line from LARKIN D 115.00 BRKR to BRKR POTREROD 115.00
1 33200 33201 "1 " 1 # LINE-TRANSFER POTREROD to LARKIN E
4 33200 0 "3 " 1 # RESTORE LARKIN D load
0
#
#
# (5) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33201 33203 "1 " 0 # line from LARKIN E 115.00 BRKR to BRKR MISSON 115.00
0
#
#
# (6) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
# Potrero - Larkin #2 115 kV Line
1 33201 33211 "1 " 0 # line from LARKIN E 115.00 BRKR to BRKR POTREROE 115.00
0
#
#
# (7) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33202 33208 "1 " 0 # line from LARKIN F 115.00 BRKR to BRKR MARTIN C 115.00
1 33202 33208 "1 " 1 # LINE-TRANSFER MARTIN C to LARKIN E
4 33202 0 "3 " 1 # RESTORE LARKIN F load
0
#
#
# (8) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33203 33204 "1 " 0 # line from MISSON 115.00 BRKR to BRKR POTREROD 115.00
0
#
#
# (9) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33203 33205 "1 " 0 # line from MISSON 115.00 BRKR to BRKR HNTRS PT 115.00
0
#
#
# (10) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33203 33205 "2 " 0 # line from MISSON 115.00 BRKR to BRKR HNTRS PT 115.00
0
#
#
# (11) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33211 33204 "1 " 0 # line from POTREROE 115.00 BRKR to BRKR POTREROD 115.00
0
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APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

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#
#
# (12) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33204 33206 "1 " 0 # line from POTREROD 115.00 BRKR to (2) BAYSHOR1 115.00
1 33206 33208 "1 " 0 # line from BAYSHOR1 115.00 (2) to BRKR MARTIN C 115.00
4 33206 0 "1 " 0 # LOAD-DROP BAYSHOR1 115.00 LOAD==4.75(0.68)
0
#
#
# (13) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33204 33207 "1 " 0 # line from POTREROD 115.00 BRKR to (2) BAYSHOR2 115.00
1 33207 33208 "1 " 0 # line from BAYSHOR2 115.00 (2) to BRKR MARTIN C 115.00
4 33207 0 "2 " 0 # LOAD-DROP BAYSHOR2 115.00 LOAD==6.65(0.95)
0
#
#
# (14) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33205 33208 "1 " 0 # line from HNTRS PT 115.00 BRKR to BRKR MARTIN C 115.00
0
#
#
# (15) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33205 33208 "3 " 0 # line from HNTRS PT 115.00 BRKR to BRKR MARTIN C 115.00
0
#
#
# (16) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33208 33300 "1 " 0 # line from MARTIN C 115.00 BRKR to BRKR DALY CTY 115.00
0
#
#
# (17) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33208 33301 "1 " 0 # line from MARTIN C 115.00 BRKR to (3) DLY CTYP 115.00
1 33301 33300 "1 " 0 # line from DLY CTYP 115.00 (3) to BRKR DALY CTY 115.00
1 33301 33302 "1 " 0 # line from DLY CTYP 115.00 (3) to BRKR SERRMNTE 115.00
4 33302 0 "1 " 0 # LOAD-DROP SERRMNTE 115.00 LOAD==9.54(2.18)
0
#
#
# (18) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33208 33303 "2 " 0 # line from MARTIN C 115.00 BRKR to BRKR EST GRND 115.00
0
#
#
# (19) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33208 33307 "1 " 0 # line from MARTIN C 115.00 BRKR to BRKR MILLBRAE 115.00
0
#
#
# (20) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33208 33310 "3 " 0 # line from MARTIN C 115.00 BRKR to BRKR SANMATEO 115.00
0
#
#
# (21) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33209 33346 "1 " 0 # line from MARTIN 60.00 BRKR to (3) SNTH TP2 60.00
1 33346 33350 "1 " 0 # line from SNTH TP2 60.00 (3) to (1) SNTH LNE 60.00
1 33346 33389 "1 " 0 # line from SNTH TP2 60.00 (3) to (1) PACIFJCT 60.00
4 33350 33355 "2 " 1 # LOAD-TRANSFER SNTH LNE 60.00 TO PACIFICA 60.00
LOAD==6.395504(0)
4 33350 33355 "1 " 1 # LOAD-TRANSFER SNTH LNE 60.00 TO PACIFICA 60.00
LOAD==8.524305(1.219058)
0
#
#
# (22) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33305 33208 "6 " 0 # line from SHAWROAD 115.00 (2) to BRKR MARTIN C 115.00
1 33305 33310 "6 " 0 # line from SHAWROAD 115.00 (2) to BRKR SANMATEO 115.00

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APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

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4 33305 33309 "1 " 1 # LOAD-TRANSFER SHAWROAD 115.00 TO SANPAULA 115.00
LOAD==9.00(4.36)
0
#
#
# (23) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33356 33208 "4 " 0 # line from BURLNGME 115.00 BRKR to BRKR MARTIN C 115.00
0
#
#
# (24) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33208 30695 "7 " 0 # TRAN from MARTIN C 115.00 BRKR to BRKR MARTIN C 230.00
0
#
#
# (25) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33218 33200 "1 " 0 # TRAN from LARKIN 1 12.00 (3) to BRKR LARKIN D 115.00
2 33218 33201 "3 " 0 # TRAN from LARKIN 1 12.00 (3) to BRKR LARKIN E 115.00
2 33218 33202 "5 " 0 # TRAN from LARKIN 1 12.00 (3) to BRKR LARKIN F 115.00
4 33218 0 "1 " 0 # LOAD-DROP LARKIN 1 12.00 LOAD==38.59(7.63)
4 33218 0 "3 " 0 # LOAD-DROP LARKIN 1 12.00 LOAD==34.93(6.91)
4 33218 0 "5 " 0 # LOAD-DROP LARKIN 1 12.00 LOAD==39.40(7.79)
0
#
#
# (26) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33219 33200 "2 " 0 # TRAN from LARKIN 2 12.00 (3) to BRKR LARKIN D 115.00
2 33219 33201 "4 " 0 # TRAN from LARKIN 2 12.00 (3) to BRKR LARKIN E 115.00
2 33219 33202 "6 " 0 # TRAN from LARKIN 2 12.00 (3) to BRKR LARKIN F 115.00
4 33219 0 "2 " 0 # LOAD-DROP LARKIN 2 12.00 LOAD==34.75(6.87)
4 33219 0 "4 " 0 # LOAD-DROP LARKIN 2 12.00 LOAD==34.57(6.84)
4 33219 0 "6 " 0 # LOAD-DROP LARKIN 2 12.00 LOAD==34.20(6.76)
0
#
#
# (27) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33253 33211 "1 " 0 # TRAN from POTRERO4 13.80 (1) to BRKR POTREROD 115.00
3 33253 0 "1 " 0 # GEN-DROP POTRERO4 13.80 GEN==42.90(4.45)
0
#
#
# (28) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33209 33208 "6 " 0 # TRAN from MARTIN 60.00 BRKR to BRKR MARTIN C 115.00
0
#
#
# (29) B1 GENERATOR OUTAGE
#
3 33252 0 "1 " 0 # GEN-DROP POTRERO3 20.00 GEN==206.51(4.88)
0
#
#
# (30) B1 GENERATOR OUTAGE
#
3 33253 0 "1 " 0 # GEN-DROP POTRERO4 13.80 GEN==42.90(4.45)
0
#
#
# (31) B1 GENERATOR OUTAGE
#
3 33254 0 "1 " 0 # GEN-DROP POTRERO5 13.80 GEN==42.90(2.79)
0
#
#
# (32) B1 GENERATOR OUTAGE
#
3 33255 0 "1 " 0 # GEN-DROP POTRERO6 13.80 GEN==42.90(2.91)
0
#
#
# (33) B1 GENERATOR OUTAGE
#
3 33271 0 "1 " 0 # GEN-DROP HNTRS P1 12.00 GEN==39.51(7.57)
0

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APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

```

#
#
# (34) B1 GENERATOR OUTAGE
#
3 33268      0  "1"      0      # GEN-DROP      HNTRS P2  13.80  GEN==0.00(16.37)
0
#
#
# (35) B1 GENERATOR OUTAGE
#
3 33269      0  "1"      0      # GEN-DROP      HNTRS P3  13.80  GEN==0.00(16.37)
0
#
#
# (36) B1 GENERATOR OUTAGE
#
3 33270      0  "1 "     0      # GEN-DROP      HNTRS P4  18.00  GEN==70.46(14.13)
0
#
#
# (37) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30560 30700 "1 "      0      # line from E. SHORE 230.00 BRKR to BRKR  SANMATEO 230.00
0
#
#
# (38) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30560 30700 "2 "      0      # line from E. SHORE 230.00 BRKR to BRKR  SANMATEO 230.00
0
#
#
# (39) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30630 30703 "1 "      0      # line from NEWARK D 230.00 BRKR to BRKR  RAVENSWD 230.00
0
#
#
# (40) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30640 30703 "1 "      0      # line from TESLA C  230.00 BRKR to BRKR  RAVENSWD 230.00
0
#
#
# (41) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30703 30700 "1 "      0      # line from RAVENSWD 230.00 BRKR to BRKR  SANMATEO 230.00
0
#
#
# (42) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30703 30700 "2 "      0      # line from RAVENSWD 230.00 BRKR to BRKR  SANMATEO 230.00
0
#
#
# (43) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30705 30710 "1 "      0      # line from MONTAVIS 230.00 BRKR to (3)  SLACTAP1 230.00
1 30710 30711 "1 "      0      # line from SLACTAP1 230.00 (3) to BRKR  S.L.A.C. 230.00
1 30710 30715 "1 "      0      # line from SLACTAP1 230.00 (3) to BRKR  JEFFERSN 230.00
4 30711      0  "1 "      0      # LOAD-DROP      S.L.A.C. 230.00 LOAD==46.30(10.55)
1 30711 30712 "1 "      1      # LINE-TRANSFER SLACTAP1 to SLACTAP2
4 30711      0  "***"     1      # RESTORE S.L.A.C. load
0
#
#
# (44) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30705 30712 "1 "      0      # line from MONTAVIS 230.00 BRKR to (2)  SLACTAP2 230.00
1 30712 30715 "1 "      0      # line from SLACTAP2 230.00 (2) to BRKR  JEFFERSN 230.00
0
#
#
# (45) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33307 33310 "1 "      0      # line from MILLBRAE 115.00 BRKR to BRKR  SANMATEO 115.00
0
#
#

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APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

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# (46) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33308 33303 "2 " 0 # line from SFIA-MA 115.00 (2) to BRKR EST GRND 115.00
1 33308 33310 "2 " 0 # line from SFIA-MA 115.00 (2) to BRKR SANMATEO 115.00
4 33308 33306 "1 " 1 # LOAD-TRANSFER SFIA-MA 115.00 TO SFIA 115.00
LOAD==16.98(4.76)
0
#
#
# (47) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33309 33307 "1 " 0 # line from SANPAULA 115.00 (1) to BRKR MILLBRAE 115.00
4 33309 33305 "1 " 1 # LOAD-TRANSFER SANPAULA 115.00 TO SHAWROAD 115.00
LOAD==8.00(3.88)
0
#
#
# (48) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33310 33311 "1 " 0 # line from SANMATEO 115.00 BRKR to BRKR BAY MDWS 115.00
0
#
#
# (49) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33310 33311 "2 " 0 # line from SANMATEO 115.00 BRKR to BRKR BAY MDWS 115.00
0
#
#
# (50) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33310 33312 "1 " 0 # line from SANMATEO 115.00 BRKR to BRKR BELMONT 115.00
0
#
#
# (51) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33310 33315 "1 " 0 # line from SANMATEO 115.00 BRKR to BRKR RAVENSWD 115.00
0
#
#
# (52) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33310 33356 "4 " 0 # line from SANMATEO 115.00 BRKR to BRKR BURLNGME 115.00
0
#
#
# (53) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33312 33313 "1 " 0 # line from BELMONT 115.00 BRKR to BRKR BAIR 115.00
0
#
#
# (54) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33313 33319 "1 " 0 # line from BAIR 115.00 BRKR to (3) SHREDJCT 115.00
1 33319 33314 "1 " 0 # line from SHREDJCT 115.00 (3) to (2) SHREDDER 115.00
1 33319 33315 "1 " 0 # line from SHREDJCT 115.00 (3) to BRKR RAVENSWD 115.00
1 33314 33320 "1 " 0 # line from SHREDDER 115.00 (2) to (1) LONESTAR 115.00
4 33314 0 "1 " 0 # LOAD-DROP SHREDDER 115.00 LOAD==4.66(5.30)
4 33320 0 "1 " 0 # LOAD-DROP LONESTAR 115.00 LOAD==2.69(3.59)
0
#
#
# (55) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33315 33313 "1 " 0 # line from RAVENSWD 115.00 BRKR to BRKR BAIR 115.00
0
#
#
# (56) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33315 33316 "2 " 0 # line from RAVENSWD 115.00 BRKR to BRKR CLY LNDG 115.00
0
#
#
# (57) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33315 33317 "1 " 0 # line from RAVENSWD 115.00 BRKR to BRKR CLY LNG2 115.00
0

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APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

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#
#
# (58) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33315 35350 "1 " 0 # line from RAVENSWD 115.00 BRKR to BRKR AMES BS1 115.00
0
#
#
# (59) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33315 35351 "1 " 0 # line from RAVENSWD 115.00 BRKR to BRKR AMES BS2 115.00
0
#
#
# (60) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33315 38028 "1 " 0 # line from RAVENSWD 115.00 BRKR to BRKR PLO ALTO 115.00
0
#
#
# (61) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33315 38028 "2 " 0 # line from RAVENSWD 115.00 BRKR to BRKR PLO ALTO 115.00
0
#
#
# (62) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33316 38028 "1 " 0 # line from CLY LNDG 115.00 BRKR to BRKR PLO ALTO 115.00
0
#
#
# (63) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33345 33355 "1 " 0 # line from SNTH TP1 60.00 (2) to (1) PACIFICA 60.00
1 33345 33351 "1 " 0 # line from SNTH TP1 60.00 (2) to (2) SN BRNOT 60.00
1 33351 33352 "1 " 0 # line from SN BRNOT 60.00 (2) to (2) SNANDRES 60.00
1 33352 33354 "1 " 0 # line from SNANDRES 60.00 (2) to (3) MLLBRETTP 60.00
1 33354 33324 "1 " 0 # line from MLLBRETTP 60.00 (3) to (1) MILBTAP2 60.00
1 33354 33353 "1 " 0 # line from MLLBRETTP 60.00 (3) to BRKR MILLBRAE 60.00
4 33355 33350 "2 " 1 # LOAD-TRANSFER PACIFICA 60.00 TO SNTH LNE 60.00
LOAD==5.785975(0)
4 33355 33350 "1 " 1 # LOAD-TRANSFER PACIFICA 60.00 TO SNTH LNE 60.00
LOAD==8.524305(1.009816)
4 33351 0 "1 " 0 # LOAD-DROP SN BRNOT 60.00 LOAD==3.757245(0.85516)
4 33352 0 "1 " 0 # LOAD-DROP SNANDRES 60.00 LOAD==1.8(0.410224)
0
#
#
# (64) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33357 33358 "1 " 0 # line from SAN MATO 60.00 BRKR to BRKR BERESFRD 60.00
0
#
#
# (65) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33357 33364 "1 " 0 # line from SAN MATO 60.00 BRKR to (2) ORACLE60 60.00
1 33364 33365 "1 " 0 # line from ORACLE60 60.00 (2) to BRKR SAN CRLS 60.00
4 33364 0 "1 " 0 # LOAD-DROP ORACLE60 60.00 LOAD==11.80(5.38)
0
#
#
# (66) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33358 33360 "1 " 0 # line from BERESFRD 60.00 BRKR to (2) HILLSDLLE 60.00
1 33360 33361 "1 " 0 # line from HILLSDLLE 60.00 (2) to BRKR HLLSDLJT 60.00
4 33360 33358 "1 " 1 # LOAD-TRANSFER HILLSDLLE 60.00 TO BERESFRD 60.00
LOAD==7.29(1.56)
0
#
#
# (67) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33362 33359 "1 " 0 # line from CRYSTLSG 60.00 (2) to (1) CAROLNDS 60.00
1 33362 33361 "1 " 0 # line from CRYSTLSG 60.00 (2) to (4) HLLSDLJT 60.00
1 33361 33363 "1 " 0 # line from HLLSDLJT 60.00 (4) to (2) RALSTON 60.00
1 33361 33360 "1 " 0 # line from HLLSDLJT 60.00 BRKR to (1) HILLSDLLE 60.00
1 33361 33366 "1 " 0 # line from HLLSDLJT 60.00 BRKR to (1) HLF MNBV 60.00
1 33363 33378 "1 " 0 # line from RALSTON 60.00 (2) to (3) WTRSHDTP 60.00

```


APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

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1 33378 33379 "1 " 0 # line from WTRSHDTP 60.00 (3) to (1) WATRSBED 60.00
1 33378 33380 "1 " 0 # line from WTRSHDTP 60.00 (3) to BRKR JEFFERSN 60.00
4 33362 0 "1 " 0 # LOAD-DROP CRYSTLSG 60.00 LOAD==3(0.683707)
4 33359 0 "2 " 0 # LOAD-DROP CAROLNDS 60.00 LOAD==4.839841(1.100791)
4 33359 0 "1 " 0 # LOAD-DROP CAROLNDS 60.00 LOAD==2.647357(0.600431)
4 33363 0 "2 " 0 # LOAD-DROP RALSTON 60.00 LOAD==3.129521(0)
4 33363 0 "1 " 0 # LOAD-DROP RALSTON 60.00 LOAD==8.415135(0)
4 33366 0 "3 " 0 # LOAD-DROP HLF MNBY 60.00 LOAD==8.014849(2.574577)
4 33366 0 "2 " 0 # LOAD-DROP HLF MNBY 60.00 LOAD==8.61528(3.102228)
4 33366 0 "1 " 0 # LOAD-DROP HLF MNBY 60.00 LOAD==9.024665(0.573139)
4 33379 0 "1 " 0 # LOAD-DROP WATRSBED 60.00 LOAD==0.68(0.309817)
1 33366 33389 "1 " 1 # LINE-TRANSFER HLLSDLJT 60.00 TO PACIFJCT 60.00
4 33366 0 "3 " 1 # RESTORE HALF MOON BAY load
0
#
#
# (68) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33361 33366 "1 " 0 # line from HLLSDLJT 60.00 BRKR to (1) HLF MNBY 60.00
4 33366 0 "1 " 0 # LOAD-DROP HLF MNBY 60.00 LOAD==8.64(0.55)
4 33366 0 "2 " 0 # LOAD-DROP HLF MNBY 60.00 LOAD==8.25(2.97)
4 33366 0 "3 " 0 # LOAD-DROP HLF MNBY 60.00 LOAD==7.67(2.47)
1 33366 33389 "1 " 1 # LINE-TRANSFER HLLSDLJT 60.00 TO PACIFJCT 60.00
4 33366 0 "3 " 1 # RESTORE HALF MOON BAY load
0
#
#
# (69) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33365 33367 "1 " 0 # line from SAN CRLS 60.00 BRKR to BRKR BAIR 60.00
0
#
#
# (70) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33367 33368 "1 " 0 # line from BAIR 60.00 BRKR to (2) REDWDTP1 60.00
1 33368 33373 "1 " 0 # line from REDWDTP1 60.00 (2) to (3) BLHVNTTP1 60.00
1 33373 33372 "1 " 0 # line from BLHVNTTP1 60.00 (3) to (1) BLLE HVN 60.00
1 33373 33375 "1 " 0 # line from BLHVNTTP1 60.00 (3) to BRKR CLY LNDG 60.00
4 33372 0 "1 " 0 # LOAD-DROP BLLE HVN 60.00 LOAD==5.82(1.32)
4 33372 0 "2 " 0 # LOAD-DROP BLLE HVN 60.00 LOAD==7.47(1.70)
4 33372 0 "3 " 0 # LOAD-DROP BLLE HVN 60.00 LOAD==9.83(1.32)
4 33372 0 "4 " 0 # LOAD-DROP BLLE HVN 60.00 LOAD==6.23(1.42)
4 33372 0 "5 " 0 # LOAD-DROP BLLE HVN 60.00 LOAD==25.19(4.99)
1 33374 33372 "1 " 1 # LINE-TRANSFER BLHVNTTP1 60.00 TO BLHVNTTP2 60.00
4 33372 0 "3 " 1 # RESTORE BELLE HAVEN load
0
#
#
# (71) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33367 33369 "1 " 0 # line from BAIR 60.00 BRKR to (3) REDWDTP2 60.00
1 33369 33370 "1 " 0 # line from REDWDTP2 60.00 (3) to BRKR REDWOOD 60.00
1 33369 33374 "1 " 0 # line from REDWDTP2 60.00 (3) to (2) BLHVNTTP2 60.00
1 33374 33371 "1 " 0 # line from BLHVNTTP2 60.00 (2) to (2) RAYCHEM 60.00
1 33371 33375 "1 " 0 # line from RAYCHEM 60.00 (2) to BRKR CLY LNDG 60.00
4 33370 0 "1 " 0 # LOAD-DROP REDWOOD 60.00 LOAD==9.05(2.06)
4 33370 0 "2 " 0 # LOAD-DROP REDWOOD 60.00 LOAD==4.56(1.04)
4 33370 0 "3 " 0 # LOAD-DROP REDWOOD 60.00 LOAD==8.83(2.02)
4 33370 0 "4 " 0 # LOAD-DROP REDWOOD 60.00 LOAD==6.81(1.55)
4 33370 0 "5 " 0 # LOAD-DROP REDWOOD 60.00 LOAD==22.86(4.99)
4 33371 0 "1 " 0 # LOAD-DROP RAYCHEM 60.00 LOAD==13.70(9.56)
1 33368 33370 "1 " 1 # LINE-TRANSFER REDWDTP2 60.00 TO REDWDTP1 60.00
4 33370 0 "3 " 1 # RESTORE REDWOOD CITY load
0
#
#
# (72) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33375 33382 "1 " 0 # line from CLY LNDG 60.00 BRKR to (3) S.R.I. 60.00
1 33382 33381 "1 " 0 # line from S.R.I. 60.00 (3) to BRKR GLENWOOD 60.00
2 33382 33468 "1 " 0 # TRAN from S.R.I. 60.00 (3) to (1) SRI INTL 9.11
4 33468 0 "1 " 0 # LOAD-DROP SRI INTL 9.11 LOAD==3.61(0.82)
3 33468 0 "1 " 0 # GEN-DROP SRI INTL 9.11 GEN==4.28(3.00)
3 33463 0 "3 " 0 # GEN-DROP CARDINAL 12.97
0
#
#
# (73) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#

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APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

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1 33375 35454 "1 " 0 # line from CLY LNDG 60.00 BRKR to (3) WSTNG JT 60.00
1 35454 35451 "1 " 0 # line from WSTNG JT 60.00 (3) to (2) L.ALTS J 60.00
1 35454 35453 "1 " 0 # line from WSTNG JT 60.00 (3) to (1) NRTHGRUM 60.00
1 35451 35450 "1 " 0 # line from L.ALTS J 60.00 (2) to (1) LOS ALTS 60.00
4 35453 0 "1 " 0 # LOAD-DROP NRTHGRUM 60.00 LOAD==5.34(3.73)
4 35450 0 "1 " 0 # LOAD-DROP LOS ALTS 60.00 LOAD==3.22(0.73)
4 35450 0 "2 " 0 # LOAD-DROP LOS ALTS 60.00 LOAD==8.81(0.00)
4 35450 0 "3 " 0 # LOAD-DROP LOS ALTS 60.00 LOAD==8.91(2.38)
0
#
#
# (74) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33376 33387 "1 " 0 # line from LAS PLGS 60.00 BRKR to BRKR WOODSIDE 60.00
4 33376 0 "1 " 0 # LOAD-DROP LAS PLGS 60.00 LOAD==5.92(1.35)
4 33376 0 "3 " 1 # RESTORE LAS PULGAS load
4 33376 33377 "3 " 1 # LOAD-TRANSFER LAS PLGS 60.00 TO EMRLD LE 60.00
0
#
#
# (75) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33377 33380 "1 " 0 # line from EMRLD LE 60.00 (2) to BRKR JEFFERSN 60.00
1 33377 33385 "1 " 0 # line from EMRLD LE 60.00 (2) to (3) MNLOJCT2 60.00
1 33385 33383 "1 " 0 # line from MNLOJCT2 60.00 (3) to BRKR MENLO 60.00
1 33385 33388 "1 " 0 # line from MNLOJCT2 60.00 (3) to (1) S.L.A.C. 60.00
4 33377 0 "1 " 0 # LOAD-DROP EMRLD LE 60.00 LOAD==3.69(0.84)
0
#
#
# (76) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33380 33387 "1 " 0 # line from JEFFERSN 60.00 BRKR to BRKR WOODSIDE 60.00
4 33387 33377 "3 " 1 # LOAD-TRANSFER WOODSIDE 60.00 TO EMRLD LE 60.00
4 33376 33377 "3 " 1 # LOAD-TRANSFER LAS PLGS 60.00 TO EMRLD LE 60.00
0
#
#
# (77) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33381 33384 "1 " 0 # line from GLENWOOD 60.00 BRKR to (3) MNLO JCT 60.00
1 33384 33386 "1 " 0 # line from MNLO JCT 60.00 (3) to BRKR STANFORD 60.00
1 33384 33390 "1 " 0 # line from MNLO JCT 60.00 (3) to BRKR MENLO G 60.00
3 33463 0 "3 " 0 # GEN-DROP CARDINAL 12.97
1 33388 33386 "1 " 1 # LINE-TRANSFER MNLO JCT 60.00 TO S.L.A.C. 60.00
4 33386 0 "3 " 1 # RESTORE STANFORD load
0
#
#
# (78) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
# **** 3-WINDING TRANSFORMER 33310 (30701) 30700 33460 :
2 33310 30700 "5 " 0 # TRAN from SANMATEO 115.00 BRKR to (1) SANMATEO 230.00
0
#
#
# (79) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
# **** 3-WINDING TRANSFORMER 33310 (30702) 30700 33461 :
2 33310 30700 "6 " 0 # TRAN from SANMATEO 115.00 BRKR to (1) SANMATEO 230.00
0
#
#
# (80) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
# **** 3-WINDING TRANSFORMER 33310 (30704) 30700 33462 :
2 33310 30700 "7 " 0 # TRAN from SANMATEO 115.00 BRKR to (1) SANMATEO 230.00
0
#
#
# (81) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33315 30703 "1 " 0 # TRAN from RAVENSWD 115.00 BRKR to BRKR RAVENSWD 230.00
0
#
#
# (82) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33380 30715 "1 " 0 # TRAN from JEFFERSN 60.00 BRKR to BRKR JEFFERSN 230.00
0

```

APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

```

#
#
# (83) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33367 33313 "1 " 0 # TRAN from BAIR 60.00 BRKR to BRKR BAIR 115.00
0
#
#
# (84) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33375 33316 "2 " 0 # TRAN from CLY LNDG 60.00 BRKR to BRKR CLY LNDG 115.00
0
#
#
# (85) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33375 33317 "1 " 0 # TRAN from CLY LNDG 60.00 BRKR to BRKR CLY LNG2 115.00
0
#
#
# (86) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33307 33353 "1 " 0 # TRAN from MILLBRAE 115.00 BRKR to BRKR MILLBRAE 60.00
0
#
#
# (87) B3 TRANSFORMER OUTAGE (BREAKER-TO-BREAKER)
#
2 33463 33386 "1 " 0 # TRAN from CARDINAL 12.47 (1) to BRKR STANFORD 60.00
3 33463 0 "1 " 0 # GEN-DROP CARDINAL 12.47 GEN==31.00(6.92)
3 33463 0 "2 " 0 # GEN-DROP CARDINAL 12.47 GEN==10.00(2.23)
0
#
#
# (88) B1 GENERATOR OUTAGE
#
3 33466 0 "1 " 0 # GEN-DROP UNTED CO 9.11 GEN==28.22(13.01)
0
#
#
# (89) B1 GENERATOR OUTAGE
#
3 33463 0 "1 " 0 # GEN-DROP CARDINAL 12.47 GEN==31.00(6.92)
0
#
#
# (90) B1 GENERATOR OUTAGE
#
3 33463 0 "2 " 0 # GEN-DROP CARDINAL 12.47 GEN==10.00(2.23)
0
#
#
# (91) B1 GENERATOR OUTAGE
#
3 33460 0 "1" 0 # GEN-DROP SMATO2SC 13.20 GEN==0.00(34.08)
0
#
#
# (92) B1 GENERATOR OUTAGE
#
3 33461 0 "1" 0 # GEN-DROP SMATO3SC 13.20 GEN==0.00(34.76)
0
#
#
# (93) B1 GENERATOR OUTAGE
#
3 33462 0 "1" 0 # GEN-DROP SMATO1SC 13.20 GEN==0.00(25.00)
0
#
#
# (94) B1 GENERATOR OUTAGE
#
3 33468 0 "1" 0 # GEN-DROP SRI INTL 9.11 GEN==4.28(3.00)
0
#
#
# (95) B1 GENERATOR OUTAGE
#
3 33280 0 "1 " 0 # GEN-DROP CCSFST1 13.80 GEN==15.00(1.52)
0

```

APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

```

#
#
# (96) B1 GENERATOR OUTAGE
#
3 33281      0 "1 "      0      # GEN-DROP      CCSFCT1      13.80      GEN==48.70(4.64)
0
#
#
# (97) B1 GENERATOR OUTAGE
#
3 33282      0 "1 "      0      # GEN-DROP      CCSFCT2      13.80      GEN==48.70(4.64)
0
#
#
# (98) B1 GENERATOR OUTAGE
#
3 33283      0 "1 "      0      # GEN-DROP      CCSFCT3      13.80      GEN==48.70(4.64)
0
#
#
# (99) B1 GENERATOR OUTAGE
#
3 33284      0 "1 "      0      # GEN-DROP      CCSFCT4      13.80      GEN==48.70(4.64)
0
#
#
# (100) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33208 33322 "5 "      0      # line from MARTIN C 115.00 BRKR to (3) UAL TAP 115.00
1 33322 33304 "1 "      0      # line from UAL TAP 115.00 (3) to (2) UAL COGN 115.00
1 33322 33306 "5 "      0      # line from UAL TAP 115.00 (3) to BRKR SFIA 115.00
2 33304 33466 "1 "      0      # TRAN from UAL COGN 115.00 BRKR to (1) UNTED CO 9.11
3 33466      0 "1 "      0      # GEN-DROP      UNTED CO 9.11      GEN==28.22(13.01)
0
#
#
# (101) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33306 33310 "5 "      0      # line from SFIA 115.00 BRKR to BRKR SANMATEO 115.00
0
#
#
# (102) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33204 33213 "1 "      0      # line from POTREROD 115.00 BRKR to BRKR CCSF1 115.00
0
#
#
# (103) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33204 33213 "2 "      0      # line from POTREROD 115.00 BRKR to BRKR CCSF1 115.00
0
#
#
# (104) L-1/G-1 OVERLAPPING OUTAGE
# San Mateo - Martin 230 kV Line and Potrero 7C
1 30700 30695 "1 "      0      # line from SANMATEO 230.00 BRKR to BRKR MARTIN C 230.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A 13.80      GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B 13.80      GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C 13.80      GEN==261(-29.4)
0
#
#
# (105) L-1/G-1 OVERLAPPING OUTAGE
# East Shore - San Mateo #1 230 kV Line and Potrero 7C
1 30560 30700 "1 "      0      # line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A 13.80      GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B 13.80      GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C 13.80      GEN==261(-29.4)
0
#
#
# (106) L-1/G-1 OVERLAPPING OUTAGE
# East Shore - San Mateo #2 230 kV Line and Potrero 7C
1 30560 30700 "2 "      0      # line from E. SHORE 230.00 BRKR to BRKR SANMATEO 230.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A 13.80      GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B 13.80      GEN==185(-32.3)

```

APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

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3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (107) L-1/G-1 OVERLAPPING OUTAGE
# Newark - Ravenswood 230 kV Line and Potrero 7C
1 30630 30703 "1 "      0      # line from  NEWARK D 230.00  BRKR to BRKR  RAVENSWD 230.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (108) L-1/G-1 OVERLAPPING OUTAGE
# Tesla - Ravenswood 230 kV Line and Potrero 7C
1 30640 30703 "1 "      0      # line from  TESLA C   230.00  BRKR to BRKR  RAVENSWD 230.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (109) L-1/G-1 OVERLAPPING OUTAGE
# San Mateo - Ravenswood #1 230 kV Line and Potrero 7C
1 30703 30700 "1 "      0      # line from  RAVENSWD 230.00  BRKR to BRKR  SANMATEO 230.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (110) L-1/G-1 OVERLAPPING OUTAGE
# San Mateo - Ravenswood #2 230 kV Line and Potrero 7C
1 30703 30700 "2 "      0      # line from  RAVENSWD 230.00  BRKR to BRKR  SANMATEO 230.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (111) L-1/G-1 OVERLAPPING OUTAGE
# Monta Vista - Jefferson #1 230 kV Line and Potrero 7C
1 30705 30710 "1 "      0      # line from  MONTAVIS 230.00  BRKR to (3)  SLACTAP1 230.00
1 30710 30711 "1 "      0      # line from  SLACTAP1 230.00  (3) to BRKR  S.L.A.C. 230.00
1 30710 30715 "1 "      0      # line from  SLACTAP1 230.00  (3) to BRKR  JEFFERSN 230.00
4 30711      0 "1 "      0      # LOAD-DROP      S.L.A.C. 230.00  LOAD==46.30(10.55)
1 30711 30712 "1 "      1      # LINE-TRANSFER SLACTAP1 to SLACTAP2
4 30711      0 "****"    1      # RESTORE S.L.A.C. load
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (112) L-1/G-1 OVERLAPPING OUTAGE
# Monta Vista - Jefferson #2 230 kV Line and Potrero 7C
1 30705 30712 "1 "      0      # line from  MONTAVIS 230.00  BRKR to (2)  SLACTAP2 230.00
1 30712 30715 "1 "      0      # line from  SLACTAP2 230.00  (2) to BRKR  JEFFERSN 230.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (113) L-1/G-1 OVERLAPPING OUTAGE
# Larkin D - Potrero 115 kV Line and Potrero 7C
1 33200 33204 "1 "      0      # line from  LARKIN D 115.00  BRKR to BRKR  POTREROD 115.00
1 33200 33201 "1 "      1      # LINE-TRANSFER POTREROD to LARKIN E
4 33200      0 "****"    1      # RESTORE LARKIN D load
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0

```


APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

```

#
#
# (114) L-1/G-1 OVERLAPPING OUTAGE
# Larkin E - Mission 115 kV Line and Potrero 7C
1 33201 33203 "1 " 0 # line from LARKIN E 115.00 BRKR to BRKR MISSON 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (115) L-1/G-1 OVERLAPPING OUTAGE
# Larkin E - Potrero 115 kV Line and Potrero 7C
1 33201 33211 "1 " 0 # line from LARKIN E 115.00 BRKR to BRKR POTREROE 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (116) L-1/G-1 OVERLAPPING OUTAGE
# Larkin F - Martin 115 kV Line and Potrero 7C
1 33202 33208 "1 " 0 # line from LARKIN F 115.00 BRKR to BRKR MARTIN C 115.00
1 33202 33208 "1 " 1 # LINE-TRANSFER MARTIN C to LARKIN E
4 33202 0 "***" 1 # RESTORE LARKIN F load
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (117) L-1/G-1 OVERLAPPING OUTAGE
# Mission - Potrero 115 kV Line and Potrero 7C
1 33203 33204 "1 " 0 # line from MISSON 115.00 BRKR to BRKR POTREROD 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (118) L-1/G-1 OVERLAPPING OUTAGE
# Mission - Hunters Point #1 115 kV Line and Potrero 7C
1 33203 33205 "1 " 0 # line from MISSON 115.00 BRKR to BRKR HNTRS PT 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (119) L-1/G-1 OVERLAPPING OUTAGE
# Mission - Hunters Point #2 115 kV Line and Potrero 7C
1 33203 33205 "2 " 0 # line from MISSON 115.00 BRKR to BRKR HNTRS PT 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (120) L-1/G-1 OVERLAPPING OUTAGE
# Potrero- Potrero 115 kV Line and Potrero 7C
1 33211 33204 "1 " 0 # line from POTREROE 115.00 BRKR to BRKR POTREROD 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (121) L-1/G-1 OVERLAPPING OUTAGE
# Potrero - Martin #1 115 kV Line and Potrero 7C
1 33204 33206 "1 " 0 # line from POTREROD 115.00 BRKR to (2) BAYSHOR1 115.00
1 33206 33208 "1 " 0 # line from BAYSHOR1 115.00 (2) to BRKR MARTIN C 115.00
4 33206 0 "1 " 0 # LOAD-DROP BAYSHOR1 115.00 LOAD==4.75(0.68)
#

```

APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

```

3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (122) L-1/G-1 OVERLAPPING OUTAGE
# Potrero - Martin #2 115 kV Line and Potrero 7C
1 33204 33207 "1 "      0      # line from  POTREROD  115.00  BRKR to (2)  BAYSHOR2 115.00
1 33207 33208 "1 "      0      # line from  BAYSHOR2 115.00  (2) to BRKR  MARTIN C 115.00
4 33207      0 "2 "      0      # LOAD-DROP      BAYSHOR2 115.00  LOAD==6.65(0.95)
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (123) L-1/G-1 OVERLAPPING OUTAGE
# Hunters Point - Martin #1 115 kV Line and Potrero 7C
1 33205 33208 "1 "      0      # line from  HNTRS PT 115.00  BRKR to BRKR  MARTIN C 115.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (124) L-1/G-1 OVERLAPPING OUTAGE
# Hunters Point - Martin #3 115 kV Line and Potrero 7C
1 33205 33208 "3 "      0      # line from  HNTRS PT 115.00  BRKR to BRKR  MARTIN C 115.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (125) L-1/G-1 OVERLAPPING OUTAGE
# Martin - Millbrae 115 kV Line and Potrero 7C
1 33208 33307 "1 "      0      # line from  MARTIN C 115.00  BRKR to BRKR  MILLBRAE 115.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (126) L-1/G-1 OVERLAPPING OUTAGE
# Millbrae - San Mateo 115 kV Line and Potrero 7C
1 33307 33310 "1 "      0      # line from  MILLBRAE 115.00  BRKR to BRKR  SANMATEO 115.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (127) L-1/G-1 OVERLAPPING OUTAGE
# Martin - East Grand 115 kV Line and Potrero 7C
1 33208 33303 "2 "      0      # line from  MARTIN C 115.00  BRKR to BRKR  EST GRND 115.00
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#
#
# (128) L-1/G-1 OVERLAPPING OUTAGE
# East Grand - San Mateo 115 kV Line and Potrero 7C
1 33308 33303 "2 "      0      # line from  SFIA-MA  115.00  (2) to BRKR  EST GRND 115.00
1 33308 33310 "2 "      0      # line from  SFIA-MA  115.00  (2) to BRKR  SANMATEO 115.00
4 33308 33306 "1 "      1      # LOAD-TRANSFER  SFIA-MA  115.00  TO SFIA  115.00
LOAD==16.98(4.76)
#
3 33256      0 "1 "      0      # GEN-DROP      PTRERO7A  13.80  GEN==185(-32.3)
3 33257      0 "1 "      0      # GEN-DROP      PTRERO7B  13.80  GEN==185(-32.3)
3 33258      0 "1 "      0      # GEN-DROP      PTRERO7C  13.80  GEN==261(-29.4)
0
#

```

APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

```

#
# (129) L-1/G-1 OVERLAPPING OUTAGE
# San Mateo - Martin #3 115 kV Line and Potrero 7C
1 33208 33310 "3 " 0 # line from MARTIN C 115.00 BRKR to BRKR SANMATEO 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (130) L-1/G-1 OVERLAPPING OUTAGE
# Martin - Burlingame 115 kV Line and Potrero 7C
1 33356 33208 "4 " 0 # line from BURLNGME 115.00 BRKR to BRKR MARTIN C 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (131) L-1/G-1 OVERLAPPING OUTAGE
# Burlingame - San Mateo 115 kV Line and Potrero 7C
1 33310 33356 "4 " 0 # line from SANMATEO 115.00 BRKR to BRKR BURLNGME 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (132) L-1/G-1 OVERLAPPING OUTAGE
# Martin - SF Airport 115 kV Line and Potrero 7C
1 33208 33322 "5 " 0 # line from MARTIN C 115.00 BRKR to (3) UAL TAP 115.00
1 33322 33304 "1 " 0 # line from UAL TAP 115.00 (3) to (2) UAL COGN 115.00
1 33322 33306 "5 " 0 # line from UAL TAP 115.00 (3) to BRKR SFIA 115.00
2 33304 33466 "1 " 0 # TRAN from UAL COGN 115.00 BRKR to (1) UNTED CO 9.11
3 33466 0 "1 " 0 # GEN-DROP UNTED CO 9.11 GEN==28.22(13.01)
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (133) L-1/G-1 OVERLAPPING OUTAGE
# SF Airport - San Mateo 115 kV Line and Potrero 7C
1 33306 33310 "5 " 0 # line from SFIA 115.00 BRKR to BRKR SANMATEO 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (134) L-1/G-1 OVERLAPPING OUTAGE
# San Mateo - Martin #6 115 kV Line and Potrero 7C
1 33305 33208 "6 " 0 # line from SHAWROAD 115.00 (2) to BRKR MARTIN C 115.00
1 33305 33310 "6 " 0 # line from SHAWROAD 115.00 (2) to BRKR SANMATEO 115.00
4 33305 33309 "1 " 1 # LOAD-TRANSFER SHAWROAD 115.00 TO SANPAULA 115.00
LOAD==9.00(4.36)
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (135) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33211 33205 "1 " 0 # line from POTREROE 115.00 BRKR to BRKR HNTRS PT 115.00
0
#
#
# (136) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33211 33205 "2 " 0 # line from POTREROE 115.00 BRKR to BRKR HNTRS PT 115.00
0
#
#

```


APPENDIX A – ISO CATEGORY B AUTOCON INPUT FILE

```

# (137) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 33211 33205 "3 " 0 # line from POTREROE 115.00 BRKR to BRKR HNTRS PT 115.00
0
#
#
# (138) B1 GENERATOR OUTAGE
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
0
#
#
# (139) B1 GENERATOR OUTAGE
#
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
0
#
#
# (140) B1 GENERATOR OUTAGE
#
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (141) L-1/G-1 OVERLAPPING OUTAGE
# Potrero- Hunters Point #1 115 kV Line and Potrero 7C
1 33211 33205 "1 " 0 # line from POTREROE 115.00 BRKR to BRKR HNTRS PT 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (142) L-1/G-1 OVERLAPPING OUTAGE
# Potrero- Hunters Point #2 115 kV Line and Potrero 7C
1 33211 33205 "2 " 0 # line from POTREROE 115.00 BRKR to BRKR HNTRS PT 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (143) L-1/G-1 OVERLAPPING OUTAGE
# Potrero- Hunters Point #3 115 kV Line and Potrero 7C
1 33211 33205 "3 " 0 # line from POTREROE 115.00 BRKR to BRKR HNTRS PT 115.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
#
# (144) B2 LINE OUTAGE (BREAKER-TO-BREAKER)
#
1 30715 33326 "1 " 0 # line from JEFFERSN 230.00 BRKR to BRKR TRAN STN 230.00
1 33326 30695 "1 " 0 # line from TRAN STN 230.00 BRKR to BRKR MARTIN C 230.00
0
#
#
# (145) L-1/G-1 OVERLAPPING OUTAGE
# Jefferson - Martin 230 kV Line and Potrero 7C
1 30715 33326 "1 " 0 # line from JEFFERSN 230.00 BRKR to BRKR TRAN STN 230.00
1 33326 30695 "1 " 0 # line from TRAN STN 230.00 BRKR to BRKR MARTIN C 230.00
#
3 33256 0 "1 " 0 # GEN-DROP PTRERO7A 13.80 GEN==185(-32.3)
3 33257 0 "1 " 0 # GEN-DROP PTRERO7B 13.80 GEN==185(-32.3)
3 33258 0 "1 " 0 # GEN-DROP PTRERO7C 13.80 GEN==261(-29.4)
0
#
-1
# EOF

```

Appendix B

Steady State Power Flow Results

Autocon Comparison Files

APPENDIX B - STEADY STATE POWER FLOW RESULTS

-----FROM BUS-----				-----TO BUS-----				-----BASE-----				LOADING				-----CASE-----			
Bus #	NAME	KV AREA	Bus #	NAME	KV AREA	ID	MW	MVAR	P.U.	FLOW	RATING								
30345	"MIDLFORK"	230 30	30346	"MDDLK M"	230 30	"1"	144	21	0.91**	146 MVA	159.90 MVA	07sumpk_ccsferpp_fs2_before_catb							
30345	"MIDLFORK"	230 30	30346	"MDDLK M"	230 30	"1"	144	21	0.91**	146 MVA	159.90 MVA	07sumpk_ccsferpp_fs2_after_catb							
30435	"LAKEVILLE"	230 30	31392	"LAKEVILLE"	60 30	"3"	70	25	0.93	74 MVA	80.00 MVA	07sumpk_ccsferpp_fs2_before_catb							
30435	"LAKEVILLE"	230 30	31392	"LAKEVILLE"	60 30	"3"	70	25	0.93	74 MVA	80.00 MVA	07sumpk_ccsferpp_fs2_after_catb							
30478	"LAMBIE "	230 30	32117	"LAMBIE69"	69 30	"1"	-92	25	0.95**	95 MVA	100.00 MVA	07sumpk_ccsferpp_fs2_before_catb							
30478	"LAMBIE "	230 30	32117	"LAMBIE69"	69 30	"1"	-92	25	0.95**	95 MVA	100.00 MVA	07sumpk_ccsferpp_fs2_after_catb							
30525	"C.COSTA "	230 30	30585	"LS PTAS"	230 30	"1"	339	26	0.94	829 AMPS	886.11 AMPS	07sumpk_ccsferpp_fs2_before_catb							
30525	"C.COSTA "	230 30	30585	"LS PTAS"	230 30	"1"	333	25	0.92	815 AMPS	886.11 AMPS	07sumpk_ccsferpp_fs2_after_catb							
30560	"E. SHORE"	230 30	35105	"EASTSHRE"	115 30	"1"	130	1	0.97	130 MVA	134.40 MVA	07sumpk_ccsferpp_fs2_before_catb							
30560	"E. SHORE"	230 30	35105	"EASTSHRE"	115 30	"1"	134	1	0.99	134 MVA	134.40 MVA	07sumpk_ccsferpp_fs2_after_catb							
30560	"E. SHORE"	230 30	35105	"EASTSHRE"	115 30	"2"	129	1	0.93	129 MVA	139.20 MVA	07sumpk_ccsferpp_fs2_before_catb							
30560	"E. SHORE"	230 30	35105	"EASTSHRE"	115 30	"2"	133	1	0.95	133 MVA	139.20 MVA	07sumpk_ccsferpp_fs2_after_catb							
30705	"MONTAVIS"	230 30	35455	"MNTA VSA"	60 30	"5"	118	66	1.01	135 MVA	134.40 MVA	07sumpk_ccsferpp_fs2_before_catb							
30705	"MONTAVIS"	230 30	35455	"MNTA VSA"	60 30	"5"	118	66	1.01	135 MVA	134.40 MVA	07sumpk_ccsferpp_fs2_after_catb							
30970	"MIDWAY "	230 30	34774	"MIDWAY "	115 30	"1"	-31	92	0.97	97 MVA	100.00 MVA	07sumpk_ccsferpp_fs2_before_catb							
30970	"MIDWAY "	230 30	34774	"MIDWAY "	115 30	"1"	-33	93	0.98	98 MVA	100.00 MVA	07sumpk_ccsferpp_fs2_after_catb							
31000	"HUMBOLDT"	115 30	31080	"HUMBOLDT"	60 30	"2"	8	35	0.95	36 MVA	37.50 MVA	07sumpk_ccsferpp_fs2_before_catb							
31000	"HUMBOLDT"	115 30	31080	"HUMBOLDT"	60 30	"2"	8	35	0.95	36 MVA	37.50 MVA	07sumpk_ccsferpp_fs2_after_catb							
31258	"SONOMA "	115 30	32564	"PUEBLO "	115 30	"1"	81	13	0.91	403 AMPS	441.80 AMPS	07sumpk_ccsferpp_fs2_before_catb							
31258	"SONOMA "	115 30	32564	"PUEBLO "	115 30	"1"	81	13	0.91	403 AMPS	441.80 AMPS	07sumpk_ccsferpp_fs2_after_catb							
31463	"WHEELBR "	115 30	31464	"COTWDPGE"	115 30	"1"	-87	14	0.95	419 AMPS	441.80 AMPS	07sumpk_ccsferpp_fs2_before_catb							
31463	"WHEELBR "	115 30	31464	"COTWDPGE"	115 30	"1"	-87	14	0.95	419 AMPS	441.80 AMPS	07sumpk_ccsferpp_fs2_after_catb							
31482	"PALERMO "	115 30	31508	"HONC JT3"	115 30	"1"	69	-4	0.90	322 AMPS	357.96 AMPS	07sumpk_ccsferpp_fs2_before_catb							
31482	"PALERMO "	115 30	31508	"HONC JT3"	115 30	"1"	69	-4	0.90	322 AMPS	357.96 AMPS	07sumpk_ccsferpp_fs2_after_catb							
31998	"VACA-DIX"	115 30	32088	"VACA-DXN"	60 30	"5"	74	15	0.94	75 MVA	80.00 MVA	07sumpk_ccsferpp_fs2_before_catb							
31998	"VACA-DIX"	115 30	32088	"VACA-DXN"	60 30	"5"	74	15	0.94	75 MVA	80.00 MVA	07sumpk_ccsferpp_fs2_after_catb							
32658	"BASALT "	60 30	32660	"BSLT TAP"	60 30	"1"	41	8	0.94	388 AMPS	413.77 AMPS	07sumpk_ccsferpp_fs2_before_catb							
32658	"BASALT "	60 30	32660	"BSLT TAP"	60 30	"1"	41	8	0.94	387 AMPS	413.77 AMPS	07sumpk_ccsferpp_fs2_after_catb							
=1=																			

APPENDIX B - STEADY STATE POWER FLOW RESULTS

[illegible]

APPENDIX B - STEADY STATE POWER FLOW RESULTS AUTCON OUTPUT FILE FOR ISO CATEGORY B 2007 SUMMER PEAK OPERATING CONDITIONS

-----FROM BUS-----			-----TO BUS-----			(RATE 1)		(RATE 2)		-----OUTAGE-----			(RATE 2)		FILE		OUTAGE #	
Bus #	NAME	KV AREA	Bus #	NAME	KV AREA	ID	BASE	OUTAGE	MW	MVAR	FLOW	RATING						
30525	"C. COSTA "	230 30	30585	"LS PSTAS"	230 30	"1 "	0.94	0.90	367.83	30.23	901.52	AMPS	999.07	AMPS	07sumpk_before	105		
30525	"C. COSTA "	230 30	30585	"LS PSTAS"	230 30	"1 "	0.94	0.90	367.96	30.23	901.84	AMPS	999.07	AMPS	07sumpk_before	106		
30525	"C. COSTA "	230 30	30585	"LS PSTAS"	230 30	"1 "	0.94	0.94	383.94	30.90	940.89	AMPS	999.07	AMPS	07sumpk_before	108		
30525	"C. COSTA "	230 30	30585	"LS PSTAS"	230 30	"1 "	0.92	0.92	376.89	30.89	923.50	AMPS	999.07	AMPS	07sumpk_after	108		
30525	"C. COSTA "	230 30	30585	"LS PSTAS"	230 30	"1 "	0.94	0.90	367.36	30.15	900.53	AMPS	999.07	AMPS	07sumpk_before	145		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	1.53	671.46	-136.31	1709.76	AMPS	1119.56	AMPS	07sumpk_before	106		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.85	1.48	647.67	-145.18	1655.01	AMPS	1119.56	AMPS	07sumpk_after	106		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	1.00	437.27	-96.47	1116.21	AMPS	1119.56	AMPS	07sumpk_before	107		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.85	0.95	416.18	-104.83	1068.13	AMPS	1119.56	AMPS	07sumpk_after	107		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	0.98	429.09	-97.44	1096.69	AMPS	1119.56	AMPS	07sumpk_before	108		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.85	0.95	413.25	-102.47	1060.08	AMPS	1119.56	AMPS	07sumpk_after	108		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	0.93	402.11	-110.48	1037.00	AMPS	1119.56	AMPS	07sumpk_before	109		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	0.93	402.11	-110.48	1037.00	AMPS	1119.56	AMPS	07sumpk_before	110		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	0.91	396.31	-98.77	1016.92	AMPS	1119.56	AMPS	07sumpk_before	111		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	0.91	396.28	-100.25	1017.54	AMPS	1119.56	AMPS	07sumpk_before	112		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	0.90	394.39	-96.96	1011.32	AMPS	1119.56	AMPS	07sumpk_before	132		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	0.92	350.09	-115.04	914.55	AMPS	989.03	AMPS	07sumpk_before	138		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	0.92	350.12	-114.95	914.58	AMPS	989.03	AMPS	07sumpk_before	139		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	0.94	357.22	-113.75	930.73	AMPS	989.03	AMPS	07sumpk_before	140		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.85	0.91	343.57	-116.03	899.58	AMPS	989.03	AMPS	07sumpk_after	140		
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"1 "	0.88	0.93	408.55	-90.40	1043.15	AMPS	1119.56	AMPS	07sumpk_before	145		

APPENDIX B - STEADY STATE POWER FLOW RESULTS

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APPENDIX B - STEADY STATE POWER FLOW RESULTS

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APPENDIX B - STEADY STATE POWER FLOW RESULTS AUTCON OUTPUT FILE FOR ISO CATEGORY B 2007 SUMMER PEAK OPERATING CONDITIONS

-----FROM BUS-----			-----TO BUS-----			(RATE 1)		(RATE 2)		-----OUTAGE-----			(RATE 2)		FILE		OUTAGE #	
Bus #	NAME	KV AREA	Bus #	NAME	KV AREA	ID	BASE	OUTAGE	MW	MVAR	FLOW	RATING						
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.96	364.45	-117.29	950.52 AMPS	994.05 AMPS	07sumpk_before	140				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.87	0.92	350.51	-119.57	918.71 AMPS	994.05 AMPS	07sumpk_after	140				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.91	400.13	-103.14	1028.54 AMPS	1127.09 AMPS	07sumpk_before	141				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.91	400.14	-103.91	1028.97 AMPS	1127.09 AMPS	07sumpk_before	142				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.91	400.14	-103.91	1028.97 AMPS	1127.09 AMPS	07sumpk_before	143				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.95	416.94	-93.60	1065.31 AMPS	1127.09 AMPS	07sumpk_before	145				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.87	0.91	399.59	-100.92	1026.14 AMPS	1127.09 AMPS	07sumpk_after	145				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.94	359.21	-117.93	938.44 AMPS	994.05 AMPS	07sumpk_before	29				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.87	0.92	345.05	-132.83	913.61 AMPS	994.05 AMPS	07sumpk_after	29				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.91	344.09	-119.99	903.70 AMPS	994.05 AMPS	07sumpk_before	30				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.91	344.09	-119.99	903.70 AMPS	994.05 AMPS	07sumpk_before	31				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.91	344.05	-119.99	903.61 AMPS	994.05 AMPS	07sumpk_before	32				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	1.32	573.51	-169.08	1487.39 AMPS	1127.09 AMPS	07sumpk_before	37				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.87	1.27	550.26	-170.83	1432.72 AMPS	1127.09 AMPS	07sumpk_after	37				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.90	342.40	-119.34	899.26 AMPS	994.05 AMPS	07sumpk_before	88				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.90	341.50	-119.69	897.38 AMPS	994.05 AMPS	07sumpk_before	89				
30560	"E. SHORE"	230 30	30700	"SANMATEO"	230 30	"2 "	0.90	0.90	340.27	-120.25	894.81 AMPS	994.05 AMPS	07sumpk_before	90				
30560	"E. SHORE"	230 30	35105	"EASTSHRE"	115 30	"1 "	0.97	0.91	146.75	-1.14	146.75 MVA	160.80 MVA	07sumpk_before	37				
30560	"E. SHORE"	230 30	35105	"EASTSHRE"	115 30	"1 "	0.99	0.93	149.53	-1.34	149.54 MVA	160.80 MVA	07sumpk_after	37				
30560	"E. SHORE"	230 30	35105	"EASTSHRE"	115 30	"1 "	0.97	0.92	147.33	-1.25	147.33 MVA	160.80 MVA	07sumpk_before	38				
30560	"E. SHORE"	230 30	35105	"EASTSHRE"	115 30	"1 "	0.99	0.93	150.08	-1.44	150.09 MVA	160.80 MVA	07sumpk_after	38				
30560	"E. SHORE"	230 30	35105	"EASTSHRE"	115 30	"2 "	0.93	0.91	145.81	-1.06	145.81 MVA	161.10 MVA	07sumpk_before	37				

APPENDIX B - STEADY STATE POWER FLOW RESULTS

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APPENDIX B - STEADY STATE POWER FLOW RESULTS

-----FROM BUS-----				-----TO BUS-----				(RATE 1) (RATE 2)		-----OUTAGE-----		(RATE 2)					
Bus #	NAME	KV	AREA	Bus #	NAME	KV	AREA	ID	BASE	OUTAGE	MW	MVAR	FLOW	RATING	FILE	OUTAGE #	
33204	"POTREROD"	115	30	33207	"BAYSHOR2"	115	30	"1"	0.91	1.10	146.18	-29.72	716.75	AMPS	650.15	AMPS	07sumpk_before 15
33204	"POTREROD"	115	30	33207	"BAYSHOR2"	115	30	"1"	1.17	1.44	190.75	-38.10	933.65	AMPS	650.15	AMPS	07sumpk_after 15
33204	"POTREROD"	115	30	33207	"BAYSHOR2"	115	30	"1"	0.91	1.05	139.34	-28.91	681.03	AMPS	650.15	AMPS	07sumpk_before 25
33204	"POTREROD"	115	30	33207	"BAYSHOR2"	115	30	"1"	1.17	1.31	175.10	-35.54	854.53	AMPS	650.15	AMPS	07sumpk_after 25
33204	"POTREROD"	115	30	33207	"BAYSHOR2"	115	30	"1"	0.91	1.03	137.42	-28.82	672.18	AMPS	650.15	AMPS	07sumpk_before 26
33204	"POTREROD"	115	30	33207	"BAYSHOR2"	115	30	"1"	1.17	1.30	173.21	-35.32	845.71	AMPS	650.15	AMPS	07sumpk_after 26
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	0.78	0.99	133.89	-9.81	644.59	AMPS	650.15	AMPS	07sumpk_before 11
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	1.05	1.15	155.38	-13.41	748.19	AMPS	650.15	AMPS	07sumpk_after 11
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	0.78	1.09	146.99	-14.61	710.04	AMPS	650.15	AMPS	07sumpk_before 12
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	1.05	1.46	196.08	-19.42	946.13	AMPS	650.15	AMPS	07sumpk_after 12
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	0.78	1.07	144.34	-16.91	698.58	AMPS	650.15	AMPS	07sumpk_before 13
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	1.05	1.43	192.45	-22.26	930.28	AMPS	650.15	AMPS	07sumpk_after 13
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	0.78	1.10	148.25	-18.57	718.16	AMPS	650.15	AMPS	07sumpk_before 15
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	1.05	1.49	199.75	-24.66	966.41	AMPS	650.15	AMPS	07sumpk_after 15
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	0.78	0.93	126.24	-13.13	607.55	AMPS	650.15	AMPS	07sumpk_before 25
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	1.05	1.20	162.85	-16.57	783.10	AMPS	650.15	AMPS	07sumpk_after 25
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	0.78	0.92	124.14	-13.22	597.78	AMPS	650.15	AMPS	07sumpk_before 26
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"1"	1.05	1.19	160.76	-16.53	773.37	AMPS	650.15	AMPS	07sumpk_after 26
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"3"	0.74	0.95	126.51	-19.54	614.61	AMPS	650.15	AMPS	07sumpk_before 11
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"3"	1.00	1.10	146.61	-24.49	713.08	AMPS	650.15	AMPS	07sumpk_after 11
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"3"	0.74	1.04	138.57	-25.02	676.87	AMPS	650.15	AMPS	07sumpk_before 12
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"3"	1.00	1.39	184.74	-33.09	901.18	AMPS	650.15	AMPS	07sumpk_after 12
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"3"	0.74	1.02	135.90	-27.01	666.03	AMPS	650.15	AMPS	07sumpk_before 13
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"3"	1.00	1.36	181.09	-35.53	886.18	AMPS	650.15	AMPS	07sumpk_after 13
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"3"	0.74	1.08	143.47	-25.19	699.98	AMPS	650.15	AMPS	07sumpk_before 14
33205	"HNTRS PT"	115	30	33208	"MARTIN C"	115	30	"3"	1.00	1.45	193.26	-33.42	941.44	AMPS	650.15	AMPS	07sumpk_after 14
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APPENDIX B - STEADY STATE POWER FLOW RESULTS

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APPENDIX B - STEADY STATE POWER FLOW RESULTS

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APPENDIX B - STEADY STATE POWER FLOW RESULTS AUTCON OUTPUT FILE FOR ISO CATEGORY B 2007 SUMMER PEAK OPERATING CONDITIONS

-----FROM BUS-----			-----TO BUS-----			(RATE 1)		(RATE 2)		-----OUTAGE-----			(RATE 2)		FILE		OUTAGE #
Bus #	NAME	KV AREA	Bus #	NAME	KV AREA	ID	BASE	OUTAGE	MW	MVAR	FLOW	RATING					
33316	"CLY LNG2"	115 30	33375	"CLY LNG2"	60 30	"2 "	0.75	1.20	100.97	37.37	107.66 MVA	90.00 MVA			07sumpk_before		85
33316	"CLY LNG2"	115 30	33375	"CLY LNG2"	60 30	"2 "	0.74	1.20	99.88	41.00	107.97 MVA	90.00 MVA			07sumpk_after		85
33317	"CLY LNG2"	115 30	33375	"CLY LNG2"	60 30	"1 "	0.86	0.90	85.11	32.61	91.14 MVA	100.80 MVA			07sumpk_before		82
33317	"CLY LNG2"	115 30	33375	"CLY LNG2"	60 30	"1 "	0.86	0.92	86.96	33.29	93.11 MVA	100.80 MVA			07sumpk_before		83
33317	"CLY LNG2"	115 30	33375	"CLY LNG2"	60 30	"1 "	0.85	0.92	86.07	33.49	92.36 MVA	100.80 MVA			07sumpk_after		83
33317	"CLY LNG2"	115 30	33375	"CLY LNG2"	60 30	"1 "	0.86	1.09	102.64	38.49	109.62 MVA	100.80 MVA			07sumpk_before		84
33317	"CLY LNG2"	115 30	33375	"CLY LNG2"	60 30	"1 "	0.85	1.08	101.37	38.78	108.53 MVA	100.80 MVA			07sumpk_after		84
33317	"CLY LNG2"	115 30	33375	"CLY LNG2"	60 30	"1 "	0.86	0.95	75.60	24.73	79.54 MVA	84.00 MVA			07sumpk_before		89
33317	"CLY LNG2"	115 30	33375	"CLY LNG2"	60 30	"1 "	0.85	0.94	74.78	24.93	78.83 MVA	84.00 MVA			07sumpk_after		89
33318	"SMATEO3M"	115 30	33357	"SAN MATO"	60 30	"3 "	0.90	1.04	69.21	11.30	70.13 MVA	67.50 MVA			07sumpk_before		82
33318	"SMATEO3M"	115 30	33357	"SAN MATO"	60 30	"3 "	0.94	1.05	-70.73	-7.51	71.12 MVA	67.50 MVA			07sumpk_after		82
33318	"SMATEO3M"	115 30	33357	"SAN MATO"	60 30	"3 "	0.94	0.92	-61.85	-0.28	61.85 MVA	67.50 MVA			07sumpk_after		83
33318	"SMATEO3M"	115 30	33357	"SAN MATO"	60 30	"3 "	0.90	0.93	52.23	-0.98	52.24 MVA	56.00 MVA			07sumpk_before		89
33318	"SMATEO3M"	115 30	33357	"SAN MATO"	60 30	"3 "	0.90	0.91	50.79	-1.00	50.80 MVA	56.00 MVA			07sumpk_before		90
33357	"SAN MATO"	60 30	33358	"BERESFRD"	60 30	"1 "	0.83	0.97	57.19	-4.05	534.38 AMPS	553.29 AMPS			07sumpk_before		72
33357	"SAN MATO"	60 30	33358	"BERESFRD"	60 30	"1 "	0.87	1.00	59.50	-4.62	555.97 AMPS	553.29 AMPS			07sumpk_after		72
33357	"SAN MATO"	60 30	33358	"BERESFRD"	60 30	"1 "	0.87	0.90	53.27	-6.94	500.04 AMPS	553.29 AMPS			07sumpk_after		77
33357	"SAN MATO"	60 30	33358	"BERESFRD"	60 30	"1 "	0.83	1.37	78.98	15.95	758.94 AMPS	553.29 AMPS			07sumpk_before		82
33357	"SAN MATO"	60 30	33358	"BERESFRD"	60 30	"1 "	0.87	1.38	79.84	15.19	761.53 AMPS	553.29 AMPS			07sumpk_after		82
33357	"SAN MATO"	60 30	33358	"BERESFRD"	60 30	"1 "	0.87	0.92	47.68	-5.67	446.93 AMPS	485.94 AMPS			07sumpk_after		89
33357	"SAN MATO"	60 30	33364	"ORACLE60"	60 30	"1 "	0.70	0.91	54.30	5.58	509.53 AMPS	557.14 AMPS			07sumpk_after		83
33358	"BERESFRD"	60 30	33360	"HILLSDLT"	60 30	"1 "	0.67	1.21	69.96	12.17	677.95 AMPS	558.11 AMPS			07sumpk_before		82
33358	"BERESFRD"	60 30	33360	"HILLSDLT"	60 30	"1 "	0.72	1.22	70.81	11.39	681.03 AMPS	558.11 AMPS			07sumpk_after		82
33360	"HILLSDLT"	60 30	33361	"HILLSDLTJT"	60 30	"1 "	0.55	1.09	61.25	7.76	602.49 AMPS	553.29 AMPS			07sumpk_before		82
33360	"HILLSDLT"	60 30	33361	"HILLSDLTJT"	60 30	"1 "	0.59	1.10	62.09	6.95	606.09 AMPS	553.29 AMPS			07sumpk_after		82

APPENDIX B - STEADY STATE POWER FLOW RESULTS
AUTCON OUTPUT FILE FOR ISO CATEGORY B 2007 SUMMER PEAK OPERATING CONDITIONS

-----FROM BUS-----		-----TO BUS-----		(RATE 1)		(RATE 2)	-----OUTAGE-----		(RATE 2)		-----		FILE	OUTAGE #
Bus #	NAME	KV AREA	Bus #	NAME	KV AREA	ID	BASE	OUTAGE	MW	MVAR	FLOW	RATING		
33377	"EMRLD LE"	60 30	33380	"JEFFERSN"	60 30	"1 "	0.35	0.91	-75.89	-20.85	724.50 AMPS	798.67 AMPS	07sumpk_before	72
33377	"EMRLD LE"	60 30	33380	"JEFFERSN"	60 30	"1 "	0.35	0.91	-75.89	-20.84	723.98 AMPS	798.67 AMPS	07sumpk_after	72
33383	"MENLO "	60 30	33385	"MNLOJCT2"	60 30	"1 "	0.37	1.15	-70.56	-14.27	689.86 AMPS	599.48 AMPS	07sumpk_before	72
33383	"MENLO "	60 30	33385	"MNLOJCT2"	60 30	"1 "	0.37	1.15	-70.55	-14.30	689.42 AMPS	599.48 AMPS	07sumpk_after	72
33383	"MENLO "	60 30	33390	"MENLO G "	60 30	"1 "	0.31	1.17	56.48	11.87	553.12 AMPS	471.50 AMPS	07sumpk_before	72
33383	"MENLO "	60 30	33390	"MENLO G "	60 30	"1 "	0.32	1.17	56.50	11.93	552.99 AMPS	471.50 AMPS	07sumpk_after	72
33384	"MNLO JCT"	60 30	33390	"MENLO G "	60 30	"1 "	0.38	1.13	55.70	18.52	564.87 AMPS	500.37 AMPS	07sumpk_before	82
33384	"MNLO JCT"	60 30	33390	"MENLO G "	60 30	"1 "	0.38	1.11	54.85	19.29	555.28 AMPS	500.37 AMPS	07sumpk_after	82

Appendix C

Steady State Power Flow Plots

DUE TO SECURITY CONCERNS
THE POWER FLOW DIAGRAMS ARE
NOT AVAILABLE IN ELECTRONIC FORMAT.

HARD COPIES MAY BE SECURED FROM THE
PROJECT MANAGER:
BILL PFANNER AT 654-4206

Appendix D

San Francisco Electric Reliability Power Project Worksopce

SUBSTATION WORK SCOPE FOR SAN FRANCISCO ELECTRIC RELIABILITY POWER PROJECT

This substation work scope is based on the Facilities Study Plan.

Direct Assignment Facilities

Potrero Switchyard - Outdoor

At Bus Section E, use two spare bay positions Bay 17 and Bay 19 to create two 115 kV line breaker positions to receive the two in-coming gen-tie lines by CCSF. This will require installing the following equipment:

- 1) Two 115 kV breaker-and-switch steel structures.
- 2) Two 115 kV SF6 gas power circuit breakers each with a set of two air disconnect switches and one breaker bypass switch.
- 3) Six 115 kV single phase CCVT's, three for each breaker position and installed on the line side.
- 4) Two single-circuit TSP (Tubular Steel Pole)'s and one double-circuit TSP to route the two 115 kV circuits in the congested area to a proper location/spot to interface with the two in-coming 115 kV gen-tie lines by CCSF.
- 5) New underground conduits between Potrero Switchyard Control Building and CCSF's Power Plant Control Building or where the line protective relays are located, for direct fiber for current differential relays and for needs due to SFRAS.
- 6) Install direct fiber between Potrero Switchyard Control Building and CCSF's Control Building in underground conduits for the Set A and Set B line current differential relays.

Potrero Switchyard - Indoor

Install two simplex type 19" wide switch racks for the two new line positions. Install new meters, protective relays, instrumentation and controls, and SCADA, all per Protection Requirements and Standard Practice. The major protective relays for each line position are:

- 1) GE L90 line current differential relay for Set "A" relay
- 2) Schweitzer SEL-311L 321 line current differential relay for Set "B" relay
- 3) Schweitzer SEL-2505 I/O module
- 4) Basler BE1-BPR breaker failure relay and MVAJ21 aux relay
- 5) Schweitzer SEL-279 reclosing relay

SUBSTATION WORK SCOPE FOR SAN FRANCISCO ELECTRIC RELIABILITY POWER PROJECT

Network Upgrades Facilities

Potrero Switchyard - Outdoor

- 1) Install four (4) 115 kV bus selector air switches on existing structures.

Potrero Switchyard – Indoor

- 1) Modify the existing SFRAS to accommodate the new project. At this point, full requirements have not been established and the current estimate does not include any telecommunication circuits that may be required.
- 2) Add new alarm and status points to existing SCADA RTU, Station Annunciator and automation equipment.
- 3) Modify the existing bus differential scheme to add the new breaker positions.
- 4) Make CT ratio and relay setting changes as necessary to existing relays to accommodate breaker substitutions.
- 5) Wire all new microprocessor-based relays to existing or new communications switch for remote interrogation of relays.

PG&E TOC, SFGO, San Mateo, and Potrero

- 1) Install telecom equipment for EMS telemetry and SCADA.
- 2) Update SCADA for all new relays and SFRAS DTT scheme.

SUBSTATION WORK SCOPE FOR SAN FRANCISCO ELECTRIC RELIABILITY POWER PROJECT

Additional Network Upgrades Facilities When Potrero 7 Project comes on-line

Potrero Switchyard

- 1) Add two (2) 115 kV Breakers with associated switches, structures, relaying and telecommunications equipment for the two new Potrero-Martin 115 kV cables

Martin Substation

- 1) Add two (2) 115 kV Breakers with associated switches, structures, relaying and telecommunications equipment for the two new Potrero-Martin 115 kV cables.

Transmission Line Work

- 1) Build two (2) 115 kV underground cables, approximately 6 miles between Potrero Switchyard and Martin Substation in a single trench. Each cable is assumed to have a normal rating of 250 MVA.

SFERPP Substation (CCSF's Responsibilities)

- CCSF will provide a "Metering Shed" or an enclosure for revenue metering, line protection relays and telecommunication equipment. This metering shed will conform to all the requirements in the PG&E Interconnection Handbook and specific Protection Requirements for this project and will have lighting; HVAC, AC and DC power supply, etc.
- This metering shed must be accessible from the public side and sized adequately to house all the equipment and for safe operation and maintenance.
- All the line protection equipment and telecom equipment will be engineered, designed and installed by CCSF to conform to PG&E's specifications and requirements:
 1. GE L90 line current differential relay for Set "A" relay
 2. Schweitzer SEL-311L 321 line current differential relay for Set "B" relay
 3. Schweitzer SEL-2505 I/O module
 4. Basler BE1-BPR breaker failure relay and MVAJ21 aux relay
 5. Schweitzer SEL-279 reclosing relay
- CCSF shall install RTU and provide telecom support for EMS telemetry and SCADA.

SUBSTATION WORK SCOPE FOR SAN FRANCISCO ELECTRIC RELIABILITY POWER PROJECT

- CCSF shall order and provide all the leased communication circuits, fiber optic cables and all the other required receivers for this project. These circuits (to be verified by PG&E Telecom when the project moves forward) include but are not limited to:
 1. Fiber optic cable between SFERPP Substation and Potrero Switchyard for line relaying and EMS purposes.
 2. One circuit between PG&E San Mateo Switching Center and SFERPP Substation for SCADA
 3. One circuit between PG&E SFGO and SFERPP Substation for Alternative EMS telemetry
 4. One circuit at SFERPP Substation for standby service revenue metering
 5. One dial up phone for use by PG&E
- PG&E Station Construction Test Group will provide pre-parallel inspection and witness testing, review equipment data, approve test program, etc.
- PG&E Protection and Substation Engineering Departments will review CCSF 's design of their facility for conformance to Interconnection Handbook requirements.